

STATE OF MINNESOTA  
OFFICE OF ADMINISTRATIVE HEARINGS  
FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of  
Northern States Power Company d/b/a  
Xcel Energy for Certificate of Need for  
an Extended Power Uprate at the  
Prairie Island Nuclear Generating Plant

**FINDINGS OF FACT,  
CONCLUSIONS OF LAW  
AND RECOMMENDATIONS**

In the Matter of the Application of  
Northern States Power Company d/b/a  
Xcel Energy for Certificate of Need for  
Additional Dry Cask Storage at the  
Prairie Island Nuclear Generating Plant

In the Matter of the Application of  
Northern States Power Company d/b/a  
Xcel Energy for an LEPGP Site Permit  
for the Extended Power Uprate Project  
at the Prairie Island Nuclear  
Generating Plant

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## **APPEARANCES**

An evidentiary hearing was held before Administrative Law Judge (ALJ) Richard C. Luis on June 8 - 12 and June 29, 2009, in St. Paul, Minnesota. The following appearances were made:

B. Andrew Brown and Sarah J. Kerbeshian, Attorneys at Law, Dorsey and Whitney, LLP, appeared for and on behalf of Northern States Power, d/b/a Xcel Energy (Xcel or Xcel Energy).

Julia Anderson, Assistant Attorney General, appeared for and on behalf of the Office of Energy Security (OES) of the Minnesota Department of Commerce (Department or DOC).

Robert Roche, Assistant Attorney General, appeared for and on behalf of the OES Energy Facilities Planning (EFP) Division.

David Aafedt, Attorney at Law, Winthrop & Weinstine, P.A., and Philip R. Mahowald, General Counsel, Prairie Island Indian Community, appeared for and on behalf of the Prairie Island Indian Community (the Community).

Thomas P. Harlan, Attorney at Law, Madigan, Dahl & Harlan, P.A., appeared for and on behalf of the City of Red Wing (Red Wing).

Paula Goodman Maccabee, Attorney at Law, Just Change Consulting, participated as a representative of the Prairie Island Nuclear Generating Plant (PINGP) Study Group.

Michael Kaluzniak participated as a representative of the staff of the Minnesota Public Utilities Commission (Commission or PUC).

## **STATEMENT OF ISSUES**

1. Whether the proposed Independent Spent Fuel Storage Installation (ISFSI or proposed storage facility) and proposed uprate each satisfy the criteria for a Certificate of Need (CON) in Minn. Stat. §§ 116C.83 and 216B.243, subd. 3, and Minn. Rules Ch. 7855, or whether a more reasonable and prudent alternative to the proposal exists?

2. If appropriate Certificate of Need criteria are satisfied, has Xcel satisfied the requirements for a Site Permit for the proposed expansion of the ISFSI?

The Administrative Law Judge concludes that Xcel demonstrated that its proposals meet the criteria for granting Certificates of Need for an Extended Power Uprate and Additional Dry Cask Storage; that no other party demonstrated that more reasonable and prudent alternatives exist at this time; and that location of the proposed ISFSI expansion meets all the requirements for a Site Permit.

Based on the proceedings herein, the Administrative Law Judge makes the following:

## **FINDINGS OF FACT**

### **I. Procedural History**

1. The Applicant, Northern States Power d/b/a/ Xcel Energy (Xcel or Applicant), is a public utility that generates electrical power and transmits, distributes, and sells the power to its residential and business customers within service territories assigned by state regulators in Minnesota, Wisconsin, South Dakota and North Dakota.<sup>1</sup>

2. The Prairie Island Nuclear Generating Plant ("Prairie Island Plant" or PINGP) is a 1,100-megawatt, nuclear-powered pressurized water reactor electric generating plant. The Prairie Island Plant is situated on a 560-acre parcel located on the western bank of the Mississippi River. The Prairie Island Plant is located entirely within the City of Red Wing, in Goodhue County, Minnesota.<sup>2</sup>

3. Although the plant is located in the City of Red Wing, the nearest residents to the Prairie Island Plant are the people in the Prairie Island Indian Community ("Community"). The Community is a federally recognized Native American tribal government.<sup>3</sup> Approximately 250 of the Community's members reside within three miles of the PINGP. A number of Community residences and other facilities are located on the Community's lands immediately adjacent to the Plant, including a clinic, playgrounds, and ceremonial grounds.<sup>4</sup>

4. Prior to September 2008, the Prairie Island Plant was owned by Xcel and operated by Nuclear Management Company, LLC ("NMC"), under contract with Xcel. During the pendency of this proceeding, the functions of NMC were reintegrated into Xcel. Xcel requested modification of its license to operate the Prairie Island Plant to reflect this change. On September 15, 2008, the Nuclear Regulatory Commission ("NRC") issued an Order approving transfer of the Prairie Island Plant's licenses back to Xcel Energy. The Prairie Island Plant is currently owned and operated by Xcel Energy.<sup>5</sup>

5. The Prairie Island Plant generates electricity through two nuclear reactors, Unit 1 and Unit 2. Unit 1 is licensed by the NRC to operate until 2013. Unit 2 is licensed to operate until 2014. On April 15, 2008, Xcel submitted an application to the NRC for an additional 20-year license extension for each unit.<sup>6</sup> That application remains pending with the NRC.

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<sup>1</sup> Ex. 100, Application for Certificates of Need ("CN Application") at 2-2.

<sup>2</sup> Ex. 64, FEIS, Chapter 1, at 1.1.

<sup>3</sup> See *Prairie Island Indian Community v. Minnesota Department of Public Safety*, C9-02-1012, C0-02-1013, et al. (Minn.App. April 1, 2003) (<http://www.lawlibrary.state.mn.us/archive/ctappub/0304/op021012-0401.htm>).

<sup>4</sup> Ex. 1 (CON Application) at 1-3; Final EIS, Ch. 1 at 64-65.

<sup>5</sup> Ex. 100, CN Application at 1-3, 3-1; Ex. 128 Bomberger Direct (08-510) at 3-4.

<sup>6</sup> Ex. 100, CN Application at 1-4, 1-5.

6. In its 2004 Resource Plan proceeding, Xcel requested approval of its plans to pursue a number of uprates – including the extended power uprate at the Prairie Island Plant – as part of an effort to meet identified base load needs. On July 28, 2006, the Commission issued its *Order Approving Resource Plan as Modified, Finding Compliance with Renewable Energy Objectives Statute, and Setting Filing Requirements* (“2004 Resource Plan Order”).<sup>7</sup> In the 2004 Resource Plan Order, the Commission required an expanded CO2 risk analysis and noted the possibility of modifications to Xcel’s baseload capacity at its Sherco, Monticello, and Prairie Island Plants.

7. In the 2007 legislative session, significant changes in the laws governing energy production and distribution were enacted. Due to the passage of this legislation, the Commission deferred implementation of Xcel’s PINGP extended power uprate project. The Commission moved the filing date for Xcel’s proposed PINGP uprate to December 14, 2007, or later.<sup>8</sup>

8. On December 14, 2007, Xcel filed its 2007 Resource Plan in Docket No. E-002/RP-07-1572.<sup>9</sup> Included in the 2007 Resource Plan, is Xcel’s proposal for using the Prairie Island Plant in meeting the demand for electricity. The 2007 Resource Plan also assessed alternatives to the proposed extended power uprate.<sup>10</sup>

9. On May 16, 2008, Xcel submitted an Application for two Certificates of Need: one for additional dry cask storage at the existing ISFSI at the Prairie Island Plant, and the other for an extended power uprate to increase the generating capacity of the Prairie Island Plant.<sup>11</sup>

10. Xcel’s proposed extended power uprate would implement design changes to utilize additional capacity of the nuclear reactors at the Prairie Island Plant. Xcel estimated that the uprate will increase the generating capacity of the plant by 164 megawatts. Xcel proposed to conduct the work necessary to complete the uprate during the planned 2012 and 2015 refueling outages.<sup>12</sup>

11. On July 22, 2008, the Commission accepted Xcel’s CN Application as substantially complete pending supplemental filing.<sup>13</sup> In a separate Order on that date,

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<sup>7</sup> 2004 Resource Plan Order, Docket No. E-002/RP-04-1752, at pp. 10 and 17 (July 28, 2006); Ex. 100, CN Application at 1-8.

<sup>8</sup> Order Suspending the Contested Case Proceeding, Delaying Filing Dates, and Advancing Date for Filing Next Resource Plan, Docket No. E-002/RP-04-1752 (Oct 22, 2007) at 6; Ex. 100, CN Application at 1-8 to 1-9.

<sup>9</sup> Ex. 100, CN Application at 1-9.

<sup>10</sup> See Order Approving Five-year Action Plan as Modified and Setting Filing Requirements (“2007 Resource Plan Order”), Docket No. E-002/RP-07-1572 (Aug. 5, 2009).

<sup>11</sup> Ex. 100, CN Application.

<sup>12</sup> Ex. 100, CN Application at 1-9, 3B-29.

<sup>13</sup> Ex. 105, Order Accepting Application as Substantially Complete Pending Supplemental Filing.

the Commission referred Xcel's CN Application to the Office of Administrative Hearings for a contested case proceeding and public hearing.<sup>14</sup>

12. On August 1, 2008, Xcel filed a Site Permit Application in conjunction with the proposed extended power uprate for the Prairie Island Plant.<sup>15</sup>

13. On August 5, 2009, the Commission issued its order approving Xcel Energy's five-year plan ("*2007 Resource Plan Order*"). In the *2007 Resource Plan Order*, the Commission required Xcel to obtain NRC and Minnesota approvals for the additional dry cask storage and extended power uprate projects at the Prairie Island Plant.<sup>16</sup> The Commission also required Xcel to file an evaluation of spent fuel storage and disposal options for the life of the Prairie Island Plant and the Monticello Nuclear Generating Plant ("*Monticello Plant*").<sup>17</sup>

14. The Prairie Island Plant currently has authorization from the State of Minnesota for a sufficient number of dry casks (29) to store the spent fuel generated at the Prairie Island Plant until the end of the current operating licenses in 2013 and 2014. For the reactors to continue operation through a license renewal period to 2033 (Unit 1) and 2034 (Unit 2), Xcel has determined that up to an additional 35 dry casks must be added to the existing ISFSI. Xcel has proposed to provide the site for this additional spent fuel storage by extending the concrete storage pads within the existing ISFSI located adjacent to the Prairie Island Plant.<sup>18</sup>

15. On August 15, 2008, the Commission issued an Order accepting the Site Permit Application as complete, authorizing the Office of Energy Security ("OES") Energy Facilities Permitting ("EFP") Staff to initiate the full review process under Minnesota Rules Chapter 7849, and referring the site permit matter to the Office of Administrative Hearings for a contested case proceeding.<sup>19</sup>

16. The Commission published a Notice of Filing, Public Comment Period and Public Meeting in the State Register on December 1, 2008 (33 SR 977). This Notice provided information on these dockets and informed the public about methods of commenting on the proceeding.<sup>20</sup>

17. The Administrative Law Judge ordered that the contested case proceedings for the two Certificates of Need and Site Permit Application be consolidated for the purpose of hearing all contested issues in Docket Nos. E-002/CN-08-509, E-002/CN-08-510, and E-002/GS-08-690.<sup>21</sup>

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<sup>14</sup> Ex. 106, Notice and Order for Hearing.

<sup>15</sup> Ex. 107, Site Permit Application.

<sup>16</sup> *2007 Resource Plan Order* at 14.

<sup>17</sup> *2007 Resource Plan Order* at 15.

<sup>18</sup> Ex. 100, CN Application at 1-5.

<sup>19</sup> Ex. 109, Order Accepting Site Permit Application.

<sup>20</sup> Ex. 118, Notice of Filing, Public Comment Period and Public Meeting Published in State Register.

<sup>21</sup> First Prehearing Order at ¶ 5 (Oct. 3, 2008).

18. The OES issued a Notice of Public Hearings on April 9, 2009, and provided the Notice to all individuals on the project contact list.<sup>22</sup> Notice of the public hearings was published on April 29, 2009 in the St. Paul Pioneer Press and Ellsworth Pierce County Herald; and on April 30, 2009 in the Hastings Star Gazette, the Lake City Graphic and the Red Wing Republican Eagle.<sup>23</sup> Notice of the public hearings was also published in the EQB Monitor on April 20, 2009.<sup>24</sup>

19. Combined public hearings relating to the two Certificates of Need and the Site Permit were held as provided for in the Notice, on May 14, 2009, at Red Wing Public Library, Foot Room, 225 East Avenue, Red Wing, Minnesota at 2:00 p.m. and at Prairie Island Indian Community Center, Tribal Council Chambers, 3838 Island Boulevard, Welch, Minnesota at 6:30 p.m. Approximately 15 individuals from Xcel, Commission staff, and members of the public provided comments on the record at the 2:00 p.m. session, and 16 attendees provided comment at the 6:30 p.m. session. The written public comment period ran until May 25, 2009. Numerous written comments were submitted to the Administrative Law Judge.

20. The combined evidentiary hearing on the CONs and Site Permit was held in St. Paul on June 8 – 12 and June 29, 2009.

21. The hearing record remained open for the submission of posthearing briefs. In its initial brief filed August 24, 2009, the Community offered to add additional evidence relating to the Minnesota Department of Health's Monitoring Report 2007-2008 and proposals for groundwater protection and radiation monitoring. Reply briefs were received on September 11, 2009. The PINGP Study Group also submitted additional evidence on that date. On September 11, 2009, Xcel moved to have two affidavits that respond to this additional evidence entered into the record, along with Supplemental Reply Comments and Proposed Findings of Fact. The Community filed a Memorandum in response to Xcel's September 11, 2009 Motion on September 25, 2009. The hearing record closed on that date. On October 12, 2009, the ALJ ruled he would decide on the status of the filing and rule on Xcel's Motion in this Report.

22. The Community urged that the record in this matter be further supplemented with the Minnesota Department of Health's (MDH) update of its Environmental Monitoring Report 2007-2008 ("EMR") to address issues regarding observed levels of Radium-226. This revision of the 2007-2008 EMR is not yet completed.

23. The Administrative Law Judge accepts the responsive filing by Xcel into the record of this proceeding. The information contained in that responsive filing directly addresses information and issues that were raised after the conclusion of the hearing. The affidavits offered are included in the hearing exhibit list at Exhibits 179 and 180. Xcel's supplemental filing was received by the Administrative Law Judge on September 11, 2009, and the Community's Response was filed September 25, 2009.

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<sup>22</sup> Ex. 123, Notice of Public Hearings.

<sup>23</sup> Ex. 33, Invoice from Minnesota Newspaper Association.

<sup>24</sup> (Vol. 33, No. 8) (<http://www.eqb.state.mn.us/documents/EQB%20Monitor%20%204-20-09.pdf>).



The hearing record closed on September 25, 2009. The Administrative Law Judge leaves to the discretion of the Commission whether the revised 2007-2008 EMR should be considered when it becomes available. Had the document been available before the record closed in the contested case portion of this proceeding, it would have been admitted to the record, due to the importance of the information it contains to the issues in this matter.

## **II. Related Proceedings**

24. Related proceedings that affect this proceeding are the preparation of an Environmental Impact Statement ("EIS") by OES, the relicensing proceedings for the Prairie Island Plant before the NRC, and the operating license and ISFSI license amendments before the NRC.

25. Where an applicant for a CON for a large electric power generating plant (LEPGP) has applied to the Commission for a site permit, the Department is required to prepare either an Environmental Report or EIS.<sup>25</sup> The Department elected to prepare an EIS addressing the proposed uprate to the Prairie Island Plant in lieu of an Environmental Report.

26. Under Minn. Stat. § 116C.83, an EIS is required for the construction and operation of a new or expanded ISFSI. OES opted for preparation of a single EIS to address Xcel's additional dry cask storage and extended power uprate proposals.<sup>26</sup>

27. On August 15, 2008, the OES issued a Notice of Public Information Meeting to provide information to the public regarding the Certificates of Need and Site Permit Applications and to identify issues for study in the EIS. The Notice described the proposed project, provided directions for obtaining a copy of the applications, identified the public advisor, provided a deadline for submission of comments on the scope of the EIS, and provided notice of the initial public meeting. The OES provided the Notice to all individuals on the project contact list.<sup>27</sup> Xcel Energy published notice of the public meeting in the Pierce County Herald on August 13, 2008 and in the Red Wing Republican-Eagle, the Hastings Star Gazette, the St. Paul Pioneer Press, and the Lake City Graphic on August 14, 2008, pursuant to Minn. R. 7849.5260, subp. 2.<sup>28</sup> Notice was also published in the EQB Monitor on August 25, 2008.<sup>29</sup>

28. The OES released its draft EIS Scoping Document on August 25, 2008, and also issued a press release on September 3, 2008, regarding the availability of the draft EIS Scoping Document and the public meeting.<sup>30</sup>

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<sup>25</sup> Minn. R. 7849.7030; Minn. R. 7849.7100.

<sup>26</sup> Ex. 115, EIS Scoping Decision.

<sup>27</sup> Ex. 108, Notice of Public Information Meeting.

<sup>28</sup> Ex. 112, Public Notification of Applications – Compliance Filing.

<sup>29</sup> (Vol. 32, No. 17) (<http://www.eqb.state.mn.us/documents/EQB%20Monitor8-25-08.pdf>).

<sup>30</sup> Ex. 110, Draft EIS Scoping Document; Ex. 111, OES Press Release.

29. The EIS public meeting was held as provided for in the Notice of Public Information Meeting on September 10, 2008, at Red Wing Public Library, Foot Room, 225 East Avenue, Red Wing, Minnesota at 7:00 p.m.

30. The Commission issued an Order on October 10, 2008, authorizing the formation of an advisory task force pursuant to Minn. Stat. § 216E.08 and Minn. R. 7849.5270. The Commission charged the advisory task force with assisting OES EFP staff in developing the scope of environmental review for the EIS.<sup>31</sup>

31. The advisory task force met formally three times, on October 8, 15, and 22, 2008. The meetings were open to the public, and additional people attended frequently to listen to the discussion. The advisory task force, through a process facilitated by the OES EFP, reviewed Xcel Energy's proposals, discussed relevant issues, and suggested items for the scope of the EIS.<sup>32</sup>

32. The OES issued its EIS Scoping Decision on November 13, 2008.<sup>33</sup> The OES provided a Notice of Scoping Decision and Intent to Prepare an Environmental Impact Statement to all parties on the project service list on November 21, 2008.<sup>34</sup>

33. The OES released the draft EIS ("DEIS") on March 17, 2009, for public comment.<sup>35</sup> The deadline for comments on the DEIS was May 8, 2009. The OES issued a Notice of Availability of Draft Environmental Impact Statement and Notice of Public Meeting on March 17, 2009, in accordance with Minn. R. 4410.2600 and Minn. R. 7849.5300, subp. 7. The notice announced the availability of the DEIS for public review and comment, as well as the public meeting to be held on April 21, 2009, at the Red Wing Public Library. The notice also provided the deadline for submission of written comments on the DEIS.<sup>36</sup> Notice of the DEIS and public meeting was sent to each person on the project contact list and published in the EQB Monitor on March 23, 2009,<sup>37</sup> as required by Minn. R. 4410.2600, subp. 5.<sup>38</sup>

34. The public meeting was held as provided for in the Notice of Availability of Draft Environmental Impact Statement and Notice of Public Meeting on April 21, 2009, at Red Wing Public Library, Foot Room, 225 East Avenue, Red Wing, Minnesota at 6:00 p.m.

35. The OES released the final EIS ("FEIS") on July 31, 2009, with comments due August 21, 2009. Notice of the availability of the FEIS was published in the EQB Monitor on August 10, 2009.<sup>39</sup> The Commissioner of Commerce is responsible for the

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<sup>31</sup> Ex. 114, Order Authorizing Formation of Advisory Task Force.

<sup>32</sup> Ex. 115, EIS Scoping Decision (Memorandum on Scoping Decision); Ex. 116, Advisory Task Force Summary of Work.

<sup>33</sup> Ex. 115, EIS Scoping Decision.

<sup>34</sup> Ex. 117, Notice of Scoping Decision and Intent to Prepare an Environmental Impact Statement.

<sup>35</sup> Ex. 119, DEIS.

<sup>36</sup> Ex. 120, Notice of Availability of Draft Environmental Impact Statement and Notice of Public Meeting.

<sup>37</sup> (Vol. 33, No. 6) (<http://www.eqb.state.mn.us/documents/EQB%20Monitor%203-23-09.pdf>).

<sup>38</sup> Ex. 28, DEIS Press Release.

<sup>39</sup> (Vol. 33, No. 16) (<http://www.eqb.state.mn.us/documents/EQB%20Monitor%208-10-09.pdf>).

determination as to whether the FEIS is adequate with respect to the additional dry cask storage proposal. The Commission is responsible for the determination as to whether the FEIS is adequate with respect to the extended power uprate proposal.

36. The NRC is responsible for overseeing the safe operation of nuclear generation and storage facilities. In particular, the NRC regulates the radiological, engineering, health and safety standards applicable to operation of the Prairie Island Plant and the adjacent ISFSI. The regulatory approval process to amend a nuclear facility's operating license and technical specifications is governed by 10 C.F.R. Part 50. The regulatory approval process to amend a nuclear storage facility license and technical specifications is governed by 10 C.F.R. Part 72.

37. On April 15, 2008, Xcel submitted an application to the NRC to renew the Prairie Island Plant's operating licenses for Units 1 and 2 for an additional 20 years.<sup>40</sup> Xcel anticipates receiving the renewed NRC operating licenses in 2010.<sup>41</sup> As part of the federal relicensing process, the NRC will prepare a Supplemental Environmental Impact Statement ("SEIS") for the Prairie Island Plant.<sup>42</sup>

38. Xcel noted that the Prairie Island Plant cannot operate at the increased thermal power level until the NRC approves an amendment to the operating license. Xcel indicated that it will apply for a license amendment with the NRC for the extended power uprate in the third quarter of 2010.<sup>43</sup> Xcel must also obtain a license amendment from the NRC to change to larger diameter fuel rods to implement the power uprate. Xcel requested approval of the new fuel rods on June 26, 2008. Xcel anticipated NRC approval by July 2009.<sup>44</sup>

39. Xcel noted that the Prairie Island ISFSI is currently licensed by the NRC to store spent fuel in up to 48 TN-40 casks. For the additional storage required, Xcel sought three license amendments from the NRC. The first license amendment request is to certify that an enhanced version of the TN-40 cask, referred to as the TN-40HT cask, complies with the requirements of 10 C.F.R. Part 72. This license amendment request was submitted on March 28, 2008. Xcel anticipates NRC approval of that request in October 2009. The second license amendment is renewal of the Prairie Island ISFSI license. That license was issued in October 1993 with a 20-year term. Xcel has committed to submitting a license renewal application prior to October 2011. Xcel anticipates that the NRC will renew the license prior to October 2013. The third license amendment request will be to increase the current NRC-approved 48-cask storage limit. Xcel proposed to submit this license request to the NRC in 2018 with an anticipated NRC approval in 2019.<sup>45</sup>

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<sup>40</sup> Ex. 100, CN Application at 2-6.

<sup>41</sup> Ex. 136, Carlson Direct at 13.

<sup>42</sup> Ex. 128 Bomberger Direct (08-510).

<sup>43</sup> Ex. 136, Carlson Direct at 10, 13.

<sup>44</sup> Ex. 100, CN Application at 2-8; Ex. 64, FEIS, Ch. 1 at 19.

<sup>45</sup> Ex. 100, CN Application at 2-5 to 2-6; Ex. 135, Samson Direct at 13-14.

### **III. Proposed Spent Fuel Storage Facility and Extended Power Uprate**

#### **A. Plant Characteristics and Performance**

40. The Prairie Island Plant was initially granted its operating license by the NRC in September 1970. The Prairie Island Plant uses nuclear fuel in two two-loop pressurized water reactors. This configuration uses heat from the nuclear reaction in the reactor core to heat water in the primary loop. The increase in temperature is transferred to the secondary loop in the steam generators. The steam produced in the steam generators is routed to turbine generators to produce electricity. Exhaust steam is cooled by a tertiary loop in a condenser. The water is returned to the steam generators to be boiled again. The water in all three loops is force-circulated by electrically powered pumps. Emergency cooling water is supplied by other pumps, which can be powered by on-site generators.<sup>46</sup>

41. A plant's capacity factor is a measure of its performance and is based upon the ratio of the energy that a power-generating system produces to the energy that would be produced if it were operated at full capacity throughout a given period. From 2003 through 2007, the Prairie Island Plant maintained an average capacity factor of 90.2 percent. In 2007, the Prairie Island Plant generated just under nine million megawatt-hours of electricity.<sup>47</sup> This amounts to a capacity factor of 93.85 percent.<sup>48</sup>

42. Xcel also owns the Monticello Nuclear Power Generating Plant located in Monticello, Minnesota. Xcel uses the output of the plants to provide base load service. Both plants are normally operated at full capacity around the clock for extended periods of time. The combined electricity output of the plants represents approximately 15 percent of Xcel's production capacity. The Prairie Island and Monticello Plants produce more than 28 percent of the electric energy used by Xcel Energy's customers in the Company's Upper Midwest service territory.<sup>49</sup>

#### **B. Nuclear Fuel Characteristics**

43. Nuclear fuel used in the reactors at the Prairie Island Plant consists of high-density ceramic uranium dioxide pellets. These pellets are embedded in preassembled arrays ("fuel assemblies"). The fuel assemblies are transported to the Prairie Island Plant by truck.<sup>50</sup>

44. Each fuel assembly is 7.76 by 7.76 inches around its perimeter and 161.3 inches long and consists of 179 fuel rods spaced in a 14 by 14 square array secured by means of stainless steel upper and lower tie plates. Control rod guide tubes occupy 16 locations of the array, and an instrument tube occupies one location. A fuel rod consists of high-density ceramic uranium dioxide fuel pellets, each about the size of a thimble,

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<sup>46</sup> Ex. 100, CN Application at 3-5; Ex. 107, Site Permit Application at 3-5.

<sup>47</sup> Ex. 100, CN Application at 3-1.

<sup>48</sup> Ex. 64, FEIS, Chap. 1, at 1-1.

<sup>49</sup> Ex. 100, CN Application at 1-3.

<sup>50</sup> Ex. 100, CN Application at 3-6.

stacked in a tube made of a steel alloy called Zircaloy. When filled with fuel, the air in a fuel rod is evacuated, helium is backfilled, and the rod sealed by welding plugs in each end.<sup>51</sup>

45. The reactor core of each unit is comprised of 121 fuel assemblies.<sup>52</sup>

46. Approximately every 18 to 20 months, a unit is shut down to refuel the reactor. During the shutdown, nearly 40 percent of the fuel assemblies (typically 48) are replaced with new assemblies. Each nuclear fuel assembly provides heat constantly over about a five-year period before its output declines to the point it is replaced to maintain the desired plant output level. These spent fuel assemblies are then removed from the reactor. The assemblies are stored in a pool of water ("spent fuel pool") to cool for a period of 10 to 12 years. When sufficiently cooled, the depleted assemblies are then placed in casks for storage and moved to the ISFSI.<sup>53</sup>

47. The NRC utilizes a combination of color-coded inspection findings and performance indicators to measure plant performance. The colors go from "green" to "white," "yellow" or "red," commensurate with the safety significance of the issues involved. The NRC has recently issued two "white" findings of low to moderate safety significance that will result in additional NRC oversight. These findings arose from the failure to control the position of a normally open valve for the Unit 1 auxiliary feedwater system (that acts as a backup system for providing water to steam generators) and the shipment of radioactive material from the Prairie Island Plant to a location in Pennsylvania, which exceeded radioactivity limits established by the NRC and the U.S. Department of Transportation.<sup>54</sup>

48. Xcel took immediate corrective actions regarding the valve position. The NRC undertook a supplemental inspection to ensure that Xcel's preventative action resolved the problem. Xcel explained that the radioactive level of its shipment was measured and found to be within limits at the time of shipping, but was found to be over the limit upon arrival.

49. Xcel described the PINGP as "an extremely reliable plant."<sup>55</sup> Overall the Prairie Island Plant has been well maintained, and operates at a high level of safety and reliability.<sup>56</sup> The safety issues discussed the foregoing Findings do not alter that overall conclusion.

### **C. Spent Fuel Inventory and Production**

50. Xcel has been granted authority for sufficient dry cask storage of spent nuclear fuel to allow the Prairie Island Plant to operate until the end of its current

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<sup>51</sup> Ex. 100, CN Application at 3-6; Ex. 135, Samson Direct at 5.

<sup>52</sup> *Id.*

<sup>53</sup> Ex. 100, CN Application at 3-7.

<sup>54</sup> <http://www.nrc.gov/reading-rm/doc-collections/news/2009/09-013.iii.html>.

<sup>55</sup> Tr. V. 4 at 11 (Engelking); see Xcel Exhibit 131 at 6, 10 (Engelking 509 Direct).

<sup>56</sup> See Xcel Exhibit 127 at 7 (Bomberger 509 Rebuttal).

operating licenses. The NRC has issued two operating licenses for the Prairie Island Plant , one for each of the two reactors. The operating license for the Unit 1 reactor expires on August 9, 2013, and the operating license for the Unit 2 reactor expires on October 24, 2014. As of March 31, 2009, 24 casks are now placed in the ISFSI. Twenty-nine casks are required to store spent fuel discharged prior to the end of the current operating licenses. Further, Xcel is requesting authorization from the NRC to operate the plant for an additional 20 years beyond its current license. To allow the reactors to continue to operate through a license renewal period to 2033 for Unit 1 and 2034 for Unit 2, 35 additional dry storage casks will be necessary. Xcel's Application requests authority from the State of Minnesota for the additional 35 casks to support continued operations during the life extension period.<sup>57</sup>

51. As of April 15, 2008, 2,109 fuel assemblies have been discharged from the Prairie Island Plant's reactors. Xcel estimates that 331 fuel assemblies will be discharged from the Prairie Island reactors between April 15, 2008, and the end of the current operating licenses. Xcel estimates that 1,455 fuel assemblies will be necessary to operate the reactors between the end of their current operating licenses and the expiration of the extended operating licenses through 2034. The spent fuel pool at the Prairie Island Plant has enough space to store all of the fuel discharged from the reactors between now and the end of the plant's current operating licenses in 2013 and 2014, with 29 dry casks stored at the ISFSI. This capacity does not include storage capacity for decommissioning.<sup>58</sup>

52. Xcel's Application requesting additional dry casks does not address casks that might be necessary for decommissioning. The Application only requests approval of the additional dry storage casks necessary to support the continued operation of the Prairie Island Plant until 2034. All casks necessary for decommissioning will be subject to a separate Application to be filed at a later date. Xcel estimates a total of 98 dry casks will be needed at the ISFSI to accommodate operations until 2034 and to decommission the Prairie Island Plant (29 casks presently approved for operations until 2014, 35 casks for operations until 2034 if the Application for additional dry cask storage to support license extension is granted, and 34 additional casks for decommissioning after the license extensions expire (2034)).<sup>59</sup>

#### **D. Proposed Additional Dry Cask Storage**

53. Xcel forecasts that continuing operation of the PINGP reactors through a license renewal period to 2033 and 2034 will create a need for up to an additional 35 dry casks. Xcel proposes to add this storage to the existing ISFSI.<sup>60</sup>

54. The ISFSI currently consists of a lighted area, approximately 720 feet long and 340 feet wide, located west of the Prairie Island Plant cooling towers on the 560-

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<sup>57</sup> Ex. 135, Samson Direct at 3-4.

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> Ex. 100, CN Application at 1-5.

acre Xcel Energy property. Two fences surround the facility with a monitored clear zone between the two fences.<sup>61</sup>

55. Currently, 24 casks are stored on two reinforced concrete pads, measuring 36' wide, 216' long, and 3' deep, within the storage area. Xcel proposes to store the additional casks on new 18' wide concrete pads to be located immediately south of the existing concrete pads within the ISFSI.<sup>62</sup>

56. The approach to the pads consists of 14 inches of compacted MnDOT Class 5 aggregate with a 2% slope. A 30-foot by 50-foot steel frame equipment storage building approximately 30 feet high is located on the ISFSI site. The primary purpose of this building is to store the cask transport vehicle. A smaller block building within the ISFSI houses the security equipment. Another block building outside the ISFSI houses the pressure monitoring equipment. A 17-foot high earthen berm surrounds the ISFSI. The site is monitored with cameras and other security devices. An access road connects the ISFSI to the rest of the Prairie Island Plant.<sup>63</sup>

57. The Prairie Island ISFSI is currently licensed by the NRC to store 48 TN-40 casks. In order to store an additional 16 casks, two new pads will be constructed. Construction of each new pad consists of pouring an 18-foot wide by 216-foot long by 3-foot thick slab. In addition, underground concrete ductbanks and associated electrical conduit will need to be installed from the monitoring building to the new pads. The work will include excavation of the pad area, trenching of the ductbank path, pouring the concrete pad and ductbank, and replacing the structural fill. The existing layout of the ISFSI can accommodate extensions of the concrete pads to the north and south with sufficient space to store up to 100 casks without changes to the security perimeter.<sup>64</sup>

58. Xcel's cask loading plans would not result in a need for the additional capacity of the two concrete pads prior to 2022. Xcel proposed to install the two concrete pads in the ISFSI in 2020.<sup>65</sup>

59. Xcel currently uses TN-40 casks for storage of spent nuclear assemblies. Xcel proposed use of an improved version, designated TN-40HT, to be authorized for storage in this proceeding. Both the TN-40 and TN-40HT casks are manufactured by Transnuclear, Inc. The TN-40 Dry Fuel Cask storage system currently in use at the Prairie Island Plant is licensed in accordance with federal regulations.<sup>66</sup> On March 28, 2008, Xcel submitted a license amendment request to the NRC. This request seeks a finding of compliance of the TN-40HT casks with NRC's storage requirements. Xcel

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<sup>61</sup> Ex. 100, CN Application at 3A-11.

<sup>62</sup> *Id.*

<sup>63</sup> Ex. 100, CN Application at 3A-12.

<sup>64</sup> Ex. 100, CN Application at 3A-12, 3A-27.

<sup>65</sup> Ex. 100, CN Application at 3A-27.

<sup>66</sup> See 10 C.F.R. Part 72.

anticipates that the NRC will issue the amendment to the ISFSI license in October 2009.<sup>67</sup>

60. The TN-40HT system consists of five main components: (1) TN-40HT Dry Fuel Cask, a steel container designed to hold 40 fuel assemblies and accommodate higher enriched and burned fuel assemblies; (2) lifting yoke, a steel-lifting device that interfaces with the crane to lift the cask; (3) transfer vehicle, a multi-wheel trailer used to safely support and move the cask from the Auxiliary Building to the concrete storage pads at the ISFSI; (4) certain ancillary devices used to dry and backfill the cask for storage; and (5) transport impact inhibitors, devices attached to the ends of the cask to lessen the forces on the cask in the event of an accident when the casks are removed from the ISFSI.<sup>68</sup>

61. The TN-40HT Dry Fuel Cask is comprised of an internal basket, containment vessel, lid, outer shell, neutron radiation shields, and a weather cover. The internal basket consists of stainless steel boxes separated by heat conduction and neutron absorption plates. The containment vessel is the innermost cask shell and is a 1.5-inch thick carbon steel cylinder to which a 10-inch thick carbon steel lid is bolted. Two metallic O-rings are installed on the lid to ensure there is no leakage. The outer shell is a 7.25-inch thick steel cylinder, around which are arrayed resin-filled, neutron-absorbing containers to reduce neutron radiation levels. A torospherical weather cover is provided above the cask lid to keep it clean and to avoid the accumulation of water in its recesses.<sup>69</sup>

62. Canister loading includes physically placing the spent fuel assemblies into the cask, draining, decontamination, securing the lid, and drying. The spent fuel assemblies are loaded into the cask and the lid is installed while the cask is in the spent fuel pool. The cask is lifted, drained, and moved to a decontamination area, where the lid is tightened and the cask is vacuum dried. The cask is backfilled with helium. The sealed cask is then transported to the ISFSI.<sup>70</sup>

63. Xcel intends that the ISFSI (including the expansion requested in this matter) be used for temporary storage. Xcel Energy is not relying on the U.S. Department of Energy (DOE) to begin accepting waste at the Yucca Mountain Repository before 2020, but it does expect that the DOE will eventually be successful in removing spent fuel from commercial nuclear generating plants. The NRC has estimated that the federal government will begin removal between 2020 and 2025. Upon this basis, Xcel anticipates that spent fuel could be stored at the Prairie Island Plant for between 15 and 30 additional years.<sup>71</sup>

64. On August 6, 2006, the designer of the TN-40 casks, Transnuclear, Inc., made a submittal to the NRC requesting a transportation license for the TN-40 casks.

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<sup>67</sup> Ex. 100, CN Application at 3A-14; Ex. 135, Samson Direct at 13.

<sup>68</sup> Ex. 100, CN Application at 3A-13 to 3A-14.

<sup>69</sup> Ex. 100, CN Application at 3A-14 to 3A-15.

<sup>70</sup> Ex. 100, CN Application at 3A-20 to 3A-22.

<sup>71</sup> Ex. 100, CN Application at 3A-12 to 3A-13; Ex. 128, Bomberger Direct (08-510) at 21-22.



Transnuclear is expected to submit a license amendment request to license the TN-40HT cask design for transportation. Xcel anticipates that the NRC will approve that request in 2010.<sup>72</sup> When approved, the license amendments will eliminate the need to transfer spent fuel between different casks. The new license provisions will allow the TN-40 HT casks to be loaded and shipped directly offsite without having to repackage the fuel assemblies in the spent fuel pool or transfer a cask. This approach will minimize the handling of spent fuel required for its transportation to a permanent repository.<sup>73</sup>

## **E. Proposed Extended Power Uprate**

65. To accomplish the proposed power uprate, Xcel does not expect to make significant modifications to the reactor, nuclear steam supply system, or emergency core cooling systems. The 164 megawatt total capacity uprate at the PINGP would be achieved by increasing the heat produced in the reactor and steam produced in the steam generators and improving the balance-of-plant equipment that converts the steam into electricity.<sup>74</sup>

66. Xcel will require that the steam turbines be replaced and a number of other balance-of-plant improvements be made to achieve the power uprate to be derived from the increased steam production. These major modifications will be accomplished during two planned outages. The modifications include upgrading high-pressure turbines; replacing or rewinding the main generators; replacing generator step-up transformers; replacing moisture separator reheaters; and upgrading isophase bus duct cooling.<sup>75</sup>

67. While Xcel plans few modifications for the reactor and its support systems, the reactor and support systems have been reanalyzed by Xcel to demonstrate that their functions are unaffected by operation at power uprate conditions, with an adequate safety margin remaining after the uprate is completed.<sup>76</sup>

68. Xcel is prohibited by statutory moratorium from seeking a Certificate of Need for a new nuclear power facility.<sup>77</sup> Therefore, if the extended power uprate is to be accomplished, it must occur at the existing location of the Prairie Island Plant.

## **F. Site Characteristics and Qualities**

69. Minn. Stat. § 116C.83, subd. 4b, requires that spent nuclear fuel storage be limited to the plant site at which the fuel was used. Since Xcel has an approved ISFSI at the Prairie Island Plant, Xcel did not propose an alternative site.

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<sup>72</sup> Ex. 100, CN Application at 2-6; Ex. 64, FEIS, Ch. 2 at 6.

<sup>73</sup> Ex. 100, CN Application at 5-10 to 5-11.

<sup>74</sup> Ex. 64, FEIS, Chapter 1 at 1.1.

<sup>75</sup> Ex. 64, FEIS, Chapter 1 at 1.1.

<sup>76</sup> Ex. 64, FEIS, Chapter 1 at 1.1.

<sup>77</sup> Minn. Stat. § 216B.243, subd. 3(a).

70. As discussed above, the Prairie Island Plant is located immediately adjacent to the Prairie Island Indian Community. The downtown area of Red Wing is approximately eight miles southeast (downstream) of the PINGP. The City of Hastings is approximately 13 miles northwest (upstream) of the PINGP. St. Paul is approximately 32 miles northwest and Minneapolis is approximately 39 miles northwest of the Prairie Island Plant.<sup>78</sup>

71. The Community is a Federally Recognized Indian Tribe organized under the Indian Reorganization Act, 25 U.S.C. § 476. The Community owns and operates Treasure Island Resort and Casino, employing about 1,500 people. The Community's land holdings total over 3,000 acres. Approximately 250 of the Community's total enrollment of 776 members reside within three miles of the Prairie Island Plant.<sup>79</sup>

72. The Prairie Island Plant and ISFSI are located near the Mississippi River and its associated riparian and wetland habitats. There are numerous wetlands within five miles of the Prairie Island Plant and ISFSI, all associated with the floodplains of the Mississippi, Cannon, and Vermillion Rivers. These wetland habitats and nearby upland habitats support a diversity of fauna, including fish, mollusks, turtles, frogs, birds, waterfowl, muskrats, and raccoons. The habitats are also part of the larger Mississippi River flyway ecosystem that supports migration of birds and waterfowl between the Americas.<sup>80</sup>

73. The Upper Mississippi River near the Prairie Island Plant supports a variety of plant and animal species that are typical of free-flowing rivers in the upper Midwest. The major primary producers, or plant groups, present are periphyton (attached algae), phytoplankton (floating algae), and macrophytes, which are larger flowering plants, either rooted or floating. Near the site, periphytons are the most important primary producer. Their ability to attach to underwater substrates allows these organisms to function in the higher velocity waters near Red Wing.<sup>81</sup>

74. Mississippi River aquatic communities upstream of Lock and Dam No. 3 have been monitored since 1970 to determine if the operation of the Prairie Island Plant has an effect on distribution, abundance, and overall health of aquatic biota. Since the mid-1970s, fish have been the focus of biological monitoring and study.<sup>82</sup> Lock and Dam No. 3 on the Mississippi is approximately one mile downstream from the southernmost discharge of water from the plant.

75. Fish populations in the area of the Prairie Island Plant show a high degree of stability. Fish populations in the vicinity of Prairie Island today are similar to the fish populations in the 1970s.<sup>83</sup> A relatively small number of native species (carp, planted in the Mississippi River in the 19th century, are the exception) has dominated collections

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<sup>78</sup> Ex. 64, FEIS, Ch. 1 at 58.

<sup>79</sup> Ex. 64, FEIS, Ch. 1 at 58-59.

<sup>80</sup> Ex. 64, FEIS, Ch. 2 at 16.

<sup>81</sup> Ex. 64, FEIS, Ch. 1 at 46.

<sup>82</sup> Ex. 64, FEIS, Ch. 1 at 47.

<sup>83</sup> Ex. 64, FEIS, Ch. 1 at 46-47.

for 35 years. All indications are that these populations are healthy, composed of fish in good condition, and are reproducing successfully year after year.<sup>84</sup>

76. Approximately 338 acres at the Prairie Island Plant site have not been disturbed by the construction of the Prairie Island Plant and ISFSI. This acreage is covered with nonnative herbaceous species (e.g. brome grass), shrubs, and trees. Common trees in this area include elms, cottonwoods, ashes, box elders, and burr oaks. The Prairie Island Plant site itself is surrounded by the Richard J. Dorer Memorial Hardwood State Forest. Wetland plant communities are found around, adjacent to, and, in some places, within the site.<sup>85</sup>

77. Within counties near the Prairie Island Plant site there are approximately 60 animal species and 30 plant species that are of special concern. These are species that are federally-listed or state-listed as threatened or endangered, species proposed for federal listing, candidates for federal listing, and species state-listed as species of special concern. Of these, seven species are found within one mile of the Prairie Island Plant site: Higgins Eye pearly mussel, peregrine falcon, Blanding's turtle, paddlefish, and mucket, washboard, and butterfly mussels. The Higgins Eye pearly mussel is federally listed; the other six species are state-listed.<sup>86</sup>

78. The Prairie Island Plant site occupies an outwash terrace formed on the Minnesota side of the Mississippi River. The site is located at an elevation of about 690 feet above mean sea level (msl), about 15 feet above the normal pool elevation of the river. The general area is nearly level, with a local relief ranging from about 675 feet above msl (along the river frontage) to about 700 feet above msl. There are a few scarps along the Mississippi River shoreline that have resulted from river scouring. The type of bedrock beneath the area is predominantly composed of sedimentary rock of the St. Lawrence and Franconia Formations.<sup>87</sup>

79. The Prairie Island Plant is located on Prairie Island, in a region that is extremely rich in pre-contact Mississippian Period archaeological resources. Eight pre-contact villages and hundreds of mounds have been recorded at the confluence of the Cannon and Mississippi Rivers. Other sites date to the Woodland Period, earlier than the Mississippian tradition. Prairie Island was also the site of at least one French fur trading post during the contact period. Historically, Prairie Island has been a reservation home for the Mdewakanton Dakota since 1889. There are six National Register historic sites located within five miles of the Prairie Island Plant: five of the historical sites are in Goodhue County, Minnesota, and one is in Pierce County, Wisconsin.<sup>88</sup>

#### **IV. Requirements of Statute and Rule**

80. Minn. Stat. § 116C.83, subds. 2 and 4, provide:

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<sup>84</sup> Ex. 64, FEIS, Ch. 1 at 47.

<sup>85</sup> Ex. 64, FEIS, Ch. 2 at 17.

<sup>86</sup> *Id.*

<sup>87</sup> Ex. 64, FEIS, Ch. 1 at 54, Ch. 2 at 16.

<sup>88</sup> Ex. 64, FEIS, Ch. 1 at 53.

**Subd. 2. Commission process for future additional authorization.**

Authorization of any additional dry cask storage other than that provided for in subdivision 1, or expansion or establishment of an independent spent-fuel storage facility at a nuclear generation facility in this state, is subject to approval of a certificate of need by the Public Utilities Commission pursuant to section 216B.243. In any proceeding under this subdivision, the commission may make a decision that could result in a shutdown of a nuclear generating facility. In considering an application for a certificate of need pursuant to this subdivision, the commission may consider whether the public utility that owns the nuclear generation facility in the state is in compliance with section 216B.1691 and the utility's past performance under that section.

**Subd. 4. Other conditions.** (a) The storage of spent nuclear fuel in the pool and in dry casks at a nuclear generating plant must be managed to facilitate the shipment of waste out of state to a permanent or interim storage facility as soon as feasible in a manner that allows the continued operation of the plant consistent with sections 116C.71 to 116C.83 and 216B.1645, subdivision 4.

(b) The authorization for storage capacity pursuant to this section is limited to the storage of spent nuclear fuel generated by a Minnesota nuclear generation facility and stored on the site of that facility.

81. Minn. Stat. § 216B.243, subds. 3, 3a and 3b, provide:

**Subd. 3. Showing required for construction.** No proposed large energy facility shall be certified for construction unless the applicant can show that demand for electricity cannot be met more cost effectively through energy conservation and load-management measures and unless the applicant has otherwise justified its need. In assessing need, the commission shall evaluate:

(1) the accuracy of the long-range energy demand forecasts on which the necessity for the facility is based;

(2) the effect of existing or possible energy conservation programs under sections 216C.05 to 216C.30 and this section or other federal or state legislation on long-term energy demand;

(3) the relationship of the proposed facility to overall state energy needs, as described in the most recent state energy policy and conservation report prepared under section 216C.18, or, in the case of a high-voltage transmission line, the relationship of the proposed line to regional energy needs, as presented in the transmission plan submitted under section 216B.2425;

(4) promotional activities that may have given rise to the demand for this facility;

(5) benefits of this facility, including its uses to protect or enhance environmental quality, and to increase reliability of energy supply in Minnesota and the region;

(6) possible alternatives for satisfying the energy demand or transmission needs, including but not limited to potential for increased efficiency and upgrading of existing energy generation and transmission facilities, load-management programs, and distributed generation;

(7) the policies, rules, and regulations of other state and federal agencies and local governments;

(8) any feasible combination of energy conservation improvements, required under section 216B.241, that can (i) replace part or all of the energy to be provided by the proposed facility, and (ii) compete with it economically;

(9) with respect to a high-voltage transmission line, the benefits of enhanced regional reliability, access, or deliverability to the extent these factors improve the robustness of the transmission system or lower costs for electric consumers in Minnesota;

(10) whether the applicant or applicants are in compliance with applicable provisions of sections 216B.1691 and 216B.2425, subdivision 7, and have filed or will file by a date certain an application for certificate of need under this section or for certification as a priority electric transmission project under section 216B.2425 for any transmission facilities or upgrades identified under section 216B.2425, subdivision 7;

(11) whether the applicant has made the demonstrations required under subdivision 3a; and

(12) if the applicant is proposing a nonrenewable generating plant, the applicant's assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk.

**Subd. 3a. Use of renewable resource.** The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including

environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel.

Subd. 3b. **Nuclear power plant; new construction prohibited; relicensing.** (a) The commission may not issue a certificate of need for the construction of a new nuclear-powered electric generating plant.

(b) Any certificate of need for additional storage of spent nuclear fuel for a facility seeking a license extension shall address the impacts of continued operations over the period for which approval is sought.

82. Similarly, Minn. Stat. § 216B.2422, subd. 6, requires an analysis of alternative renewable energy facilities, and a determination that a renewable energy facility is not in the public interest, when a utility proposes a new or refurbished nonrenewable energy facility. Xcel has not proposed a new generation facility or a refurbished nonrenewable plant in this matter, so this requirement does not apply. Nonetheless, a public interest analysis was done by the Department.

83. Minn. R. 7855.0120 sets forth criteria to implement the foregoing statutes. That rule provides as follows:

A certificate of need shall be granted to the applicant if it is determined that:

A. the probable direct or indirect result of denial would be an adverse effect upon the future adequacy, reliability, safety, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states, considering:

(1) the accuracy of the applicant's forecast of demand for the energy or service that would be supplied by the proposed facility;

(2) the effects of existing or expected conservation programs of the applicant, the state government, or the federal government;

(3) the effects of promotional practices in creating a need for the proposed facility, particularly promotional practices that have occurred since 1974;

(4) the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand; and

(5) the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources;

B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering:

- (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
- (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
- (3) the effects of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
- (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

C. it has been demonstrated by a preponderance of the evidence on the record that the consequences of granting the certificate of need for the proposed facility, or a suitable modification thereof, are more favorable to society than the consequences of denying the certificate, considering:

- (1) the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs;
- (2) the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility;
- (3) the effects of the proposed facility, or a suitable modification thereof, in inducing future development; and
- (4) the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality; and

D. that it has not been demonstrated on the record that the design, construction, operation, or retirement of the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments.

84. Because the standards set out in Minn. R. 7855.0120 are more detailed than the corresponding statutory language, the rule criteria are used to evaluate Xcel's compliance with both the rule and statutory requirements.

## **V. Compliance with Minn. R. 7855.0120**

### **A. Would Denial of the Requested CONs Likely Result in an Adverse Effect upon the Future Adequacy, Reliability, or Efficiency of the Energy Supply?**

85. Under Minn. Rule 7855.0120A(1), Xcel is required to demonstrate the accuracy of its forecast for energy needs. In its 2007 Resource Plan proceeding (Commission DOCKET NO. E002/RP-07-1572), Xcel made forecasts of energy and demand over a 15-year planning period. These forecasts have been updated to reflect higher fuel and construction costs and slowing economic indicators.<sup>89</sup>

86. The PINGP Study Group noted that Xcel's "2010 Budget Forecast" shows that forecasted demand will be reduced by 803 MW in 2012, compared to the demand forecast in the CON Application. By 2023, forecasted demand will be reduced by 1,549 MW, which is more than the total 1,100 MW supplied by the Prairie Island Nuclear Plant.<sup>90</sup>

87. Xcel has made different resource choices and has deferred or delayed other projects as a result of the forecast reduction of overall demand.<sup>91</sup> The PINGP Study Group maintains that these choices made in the face of demand decline far larger than the 164 MW uprate proposal only establish Xcel's preference, not the need for the uprate project to ensure energy supply.<sup>92</sup>

88. The OES has conducted on-going analyses of utilities' forecasts, including Xcel's forecast. As part of this analysis, OES Witness Hwikwon Ham reviewed Xcel's forecast modeling and input data. Mr. Ham incorporated the higher energy conservation goal provided by Minn. Stat. §216.241, subd. 1c, as recommended for this 510 Docket by OES Witness Christopher T. Davis.<sup>93</sup> The OES concluded that Xcel's forecast is reasonable for use in the 510 Docket.<sup>94</sup>

89. The OES concluded that Xcel's forecast understates the likely additional energy that Xcel will need in the future. Use of Xcel's understated forecast in this CN proceeding interjects a bias against Xcel's demonstration of need.<sup>95</sup> Xcel is likely to require more energy than its forecast suggests.

90. OES independently confirmed the reasonableness of Xcel's energy and demand forecast for the purposes of demonstrating need. No party challenged Xcel's or the OES's forecast methodology.

91. The OES also maintained that the Prairie Island Plant's role as an existing power plant that currently serves customers, the forecast of the demand for electrical

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<sup>89</sup> Ex. 125, Resource Plan Reply Comments.

<sup>90</sup> Ex. 146 (IR No. 40); Tr. V 4, p. 128 (Engelking).

<sup>91</sup> Tr. V 4, p. 131 (Engelking).

<sup>92</sup> PINGP Study Group Comment, at 27.

<sup>93</sup> OES Exhibit 506 at 3 (Ham 510 Direct).

<sup>94</sup> OES Exhibit 506 at 2, 4 (Ham 510 Direct).

<sup>95</sup> OES Exhibit 506 at 4 (Ham 510 Direct).



power, and the energy that customers will use has no material impact on the analysis in this proceeding.<sup>96</sup> Xcel and the OES each performed numerous sensitivity analyses, including a “very low growth” sensitivity analysis by Xcel Energy and a “no load growth” sensitivity analysis by the OES. These analyses demonstrated that Xcel’s existing generation portfolio is an important aspect of Xcel’s service to its customers. The forecasted levels of energy and demand are not determinative of a demonstration of need.<sup>97</sup>

92. The OES maintains that a short-term recession should have no measurable impact on long-term economic growth unless there is a structural change in that short-term recession.<sup>98</sup> Because data does not exist to evaluate the likely speed and magnitude of recovery from the recession, Mr. Ham relied on a sensitivity analysis that assumed no growth in Xcel’s demand and energy requirements over the analysis period of this 510 Docket. This assumption was used as proxy to test the impact of a no growth scenario arising out of the current recession.<sup>99</sup>

93. The OES has reviewed the promotional practices of Xcel many times since 2006.<sup>100</sup> OES provided testimony and comments from several recent dockets regarding the issue of Xcel’s promotional practices.<sup>101</sup>

94. Xcel has not engaged in any promotional practices that created the need for the continued operation or extended power uprate at the Prairie Island Plant.<sup>102</sup> Xcel maintains a number of programs that promote electricity conservation to reduce the need for more generating plants.<sup>103</sup> Xcel has satisfied Minn. Rule 7849.0120 A(3) for both the ISFSI expansion and power uprate.

95. Under the current pricing methodology, electricity from the Prairie Island Plant is one of Xcel’s lowest-cost resources to dispatch.<sup>104</sup> Along with the Monticello Plant, the Prairie Island Plant is among the most reliable plants on Xcel Energy’s system. Both nuclear plants operate at full capacity, around the clock for extended periods of time. Each plant operates from 18 to 24 months without interruption. Xcel describes the nuclear plants as two of the most cost-effective generating plants in its generation portfolio. The cost of producing electricity at these plants is relatively low because the fixed costs are spread across more megawatt hours of energy produced than Xcel’s non-nuclear generation plants. Xcel has relied on the Prairie Island and

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<sup>96</sup> OES Exhibit 514 at 33-34 (Rakow 510 Public Direct); Ex. 132, Engelking Direct (08-510) at 11.

<sup>97</sup> Ex. 514, Rakow Direct (08-510) at 33-34; Ex. 134, Wishart Direct (08-510) at 12.

<sup>98</sup> OES Exhibit 506 at 7 (Ham 510 Direct).

<sup>99</sup> *Id.*

<sup>100</sup> OES Exhibit 510 at 38 (Rakow 509 Public Direct).

<sup>101</sup> OES Exhibit 510 at 38-39 (Rakow 509 Public Direct); OES Exhibit 511 at (SRR-11) (Rakow 509 Public Direct Attachments).

<sup>102</sup> Ex. 100, CN Application at 9-7; Ex. 514, Rakow Direct (08-510) at 40-41.

<sup>103</sup> Ex. 100, CN Application at 9-7.

<sup>104</sup> Tr. Vol. 4 at 11 (Engelking).

Monticello Plants as the foundation of Xcel's energy supply portfolio. Both plants produce significant amounts of electricity without generating carbon emissions.<sup>105</sup>

96. The OES considered the ability of current facilities and planned facilities that do not require certificates of need to meet anticipated future demand. These facilities are included for consideration in the Strategist model.<sup>106</sup>

97. The other OES cost analyses, performed by Dr. Rakow, were based on Xcel's assumptions of forecasted energy and demand. The no-growth test was selected as a contingency scenario for Strategist to model in addition to Dr. Rakow's four main scenarios (relicense PINGP, coal alternative, unconstrained alternative, and wind combined with non-renewables alternative).

98. Dr. Rakow's no-growth scenario utilized Xcel's 2008 energy and demand levels and assumed that these levels did not increase at all for the duration of the analysis period through 2034.<sup>107</sup> Dr. Rakow determined that in the event that no additional growth in electric use was experienced, relicensing the PINGP was the least cost option by a margin ranging between \$0.8 billion present value societal costs (PVSC) and \$1.9 billion PVSC. The OES maintains that this analysis demonstrates that Xcel's forecast is "largely irrelevant" for purposes of the Commission's decision in this 510 Docket.<sup>108</sup>

99. Under the various alternatives and sensitivities considered by Xcel and the OES, the continued operation of the Prairie Island Plant was the least cost alternative. Under these models, continued operation of the Prairie Island Plant provided significant environmental benefits over the alternatives in the model.<sup>109</sup> The OES agreed with Xcel that there exists no more cost-effective alternative to the proposed ISFSI Expansion under Minn. Rule 7855.0120B(1)-(3).<sup>110</sup>

100. While the Prairie Island Plant is not a renewable energy source, Xcel contends that approving additional dry cask storage will help Xcel comply with the Renewable Energy Standard ("RES") imposed by Minn. Stat. § 216B.1691. By continuing the Prairie Island Plant in service, Xcel maintains that it is relieved of the need to operate natural gas-fired power plants to provide base load power. Xcel asserts that these resources can then be used as a complement to Xcel Energy's expanding use of wind resources. Xcel also contends that the continued use of nuclear energy to supply Xcel's base load will provide a hedge against future variations in natural gas prices.<sup>111</sup>

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<sup>105</sup> Ex. 132, Engelking Direct (08-510) at 3.

<sup>106</sup> Ex. 514, Rakow Direct (08-510) at 10-11.

<sup>107</sup> OES Exhibit 514 at 33 (Rakow 510 Public Direct).

<sup>108</sup> OES Exhibit 514 at 33-34 (Rakow 510 Public Direct).

<sup>109</sup> Ex. 514, Rakow Direct (08-510) at 33; Ex. 134, Wishart Direct (08-510) at 12-13, (SWW-2), Rev. Tables 4-1 to 4-4.

<sup>110</sup> See OES Exhibit 514 at 34 (Rakow 510 Public Direct).

<sup>111</sup> Ex. 100, CN Application at 1-15, 10-2.

101. Xcel has shown that regardless of approval by the NRC of the requests for 20-year license extensions for PINGP Units 1 and 2, the Prairie Island Plant would have to cease operations after 2013 and 2014, respectively, without an expansion of the ISFSI to provide additional dry casks to store spent nuclear fuel.<sup>112</sup>

102. Rejection of Xcel's CON application in the 510 Docket would require Xcel to build or purchase replacement baseload capacity and associated energy, beginning in 2013.<sup>113</sup>

103. Xcel has shown that continued operation of the Prairie Island Plant provides significant financial and environmental benefits to Xcel's customers.<sup>114</sup> Denial of the requested Certificate of Need for additional storage would require a shutdown of the Prairie Island Plant in 2013-2014. Such a shutdown would result in a less economically efficient regional power system and an increase in adverse impacts on the environment.<sup>115</sup> Xcel has demonstrated that denial of the requested Certificate of Need for additional storage would adversely affect the future adequacy, reliability, safety and efficiency of the energy supply to Xcel, its customers, and the people of Minnesota and neighboring states.

104. Regarding the proposed Extended Power Uprate, the alternative of wind generation mixed with non-renewables would be more expensive by between \$531 million and \$703 million in present value societal costs (PVSC).<sup>116</sup> Under base case conditions, the alternative of wind mixed with non-renewables would be more expensive than the Extended Power Uprate by about \$617 million PVSC.<sup>117</sup>

105. As to biomass, that alternative would be more expensive than the proposed Extended Power Uprate by between \$404 million PVSC and \$1,121 million PVSC and by about \$763 million PVSC under base case conditions.<sup>118</sup>

106. OES calculated that a non-renewable coal alternative would be more expensive than the proposed Power Uprate by between \$263 million PVSC and \$435 million PVSC. An unconstrained nonrenewable alternative would be more expensive than the Uprate by between \$320 million PVSC and \$550 million PVSC.<sup>119</sup>

107. The record in this matter demonstrates that there are significant cost advantages to the proposed Extended Power Uprate.<sup>120</sup>

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<sup>112</sup> OES Exhibit 514 at 33-34 (Rakow 510 Public Direct).

<sup>113</sup> *Id.*

<sup>114</sup> See Ex. 134, Wishart Direct (08-510) at (SWW-2), Rev. Table 4-1, 4-2, 4-3, and 4-4.

<sup>115</sup> Ex. 132, Engelking Direct (08-510) at 12-13.

<sup>116</sup> OES Exhibit 510 at 19 (Rakow 509 Public Direct).

<sup>117</sup> *Id.*

<sup>118</sup> OES Exhibit 510 at 19 (Rakow 509 Public Direct).

<sup>119</sup> OES Exhibit 510 at 30-31 (Rakow 509 Public Direct).

<sup>120</sup> OES Exhibit 510 at 19, 31 (Rakow 509 Public Direct).

## **B. Have More Reasonable and Prudent Alternatives to the Storage Facility and Uprate Been Demonstrated?**

### **1. Generation Alternatives**

108. As part of its application, Xcel performed a comprehensive screening analysis to determine whether alternative forms of electricity generation would achieve similar reliability and would be able to replace the 1,100 MW and approximately 8.5 million megawatt hours of energy currently provided by the Prairie Island Plant.<sup>121</sup>

109. Xcel considered a number of renewable energy sources for inclusion in its analysis. These sources included hydro, wind, solar, geothermal, biomass, and landfill gas. Xcel applied a screen to ensure that the energy sources studied were suitable replacements for the Prairie Island Plant. The screening criteria were: 1) operation as baseload capacity; 2) operational reliability (both for production and integration with the supply system); 3) environmental impacts (including air emissions, effects on land, water consumption, wastewater generation, and noise); and 4) economic effects (including jobs, regional development, and tax revenues).<sup>122</sup> These screening criteria are reasonable and similar to the screening criteria used in comparable CON dockets before the Commission in the recent past.<sup>123</sup>

110. Applying the screens to the renewable energy alternatives resulted in the elimination of all them, except biomass and wind with a supplemental generation source (such as natural gas). The OES concluded that Xcel's application of the screening criteria generally is reasonable. Dr. Rakow noted that subsequent to Xcel's filing of the Petition, the Commission determined that renewables backed by non-renewable sources can meet the criteria in the renewable preference statutes. For this reason, Dr. Rakow included a "wind plus nonrenewable" option in his own renewables analysis. Considering the size and baseload characteristics of the energy needed to replace the PINGP (approximately 1,100 MW), and the size of typical biomass projects (less than 100 MW), Dr. Rakow agreed with Xcel's conclusion that biomass (including wastewater sludge) can be excluded from further analysis as an alternative.<sup>124</sup>

111. Dr. Rakow also considered a wind combined with non-renewable alternative that added two additional wind units (100 MW each) each year between 2013 and 2017 (10 units totaling 1,000 MW of additional wind).<sup>125</sup> The results of Dr. Rakow's analysis show that the alternative of wind mixed with non-renewables would be more expensive, emit greater quantities of pollutants, rely more on both natural gas and coal energy, and require the addition of more new generation facilities than would the continued operation of the Prairie Island Plant.<sup>126</sup> After considering externality costs associated with nuclear power, Dr. Rakow concluded that renewable alternatives are

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<sup>121</sup> Ex. 134, Wishart Direct (08-510) at 8-9.

<sup>122</sup> OES Exhibit 514 at 8 (Rakow 510 Public Direct).

<sup>123</sup> OES Exhibit 514, at 9 (Rakow 510 Public Direct).

<sup>124</sup> OES Exhibit 514 at 10 (Rakow 510 Public Direct).

<sup>125</sup> Ex. 514, Rakow Direct (08-510) at 18.

<sup>126</sup> Ex. 514, Rakow Direct (08-510) at 20.

either not feasible or are more expensive (including environmental costs) than continued operation of the Prairie Island Plant.<sup>127</sup>

112. In 2008 dollars, the current cost estimates for decommissioning are \$1.026 billion for radiological removal, \$83.7 million for site restoration, and \$404 million for ISFSI operations.<sup>128</sup> This cost, assessed to ratepayers based on the decommissioning fund docket, reflects 40 years of costs after shut-down of the Prairie Island Nuclear Plant.<sup>129</sup>

113. There is no information in the record of this proceeding regarding costs to operate or manage the Prairie Island ISFSI for a long-term indefinite period such as the 200 years identified in the FEIS.<sup>130</sup> In the event that nuclear waste storage extended for more than 40 years, the analysis simply assumed that Xcel could get additional funds from a variety of sources, including Xcel ratepayers.<sup>131</sup> The PINGP Study Group maintained that the absence of the cost of decommissioning in an analysis of the comparative cost of nuclear power to a renewable wind/natural gas alternative renders the conclusion unreliable.<sup>132</sup>

114. The OES noted that from a present value financing perspective, assuming that decommissioning costs are fixed, the benefit of delaying decommissioning by operating the Prairie Island Nuclear Plant another twenty years would be in the tens of millions of dollars. In the context of the costs in this proceeding, that benefit would amount to “a rounding error.”<sup>133</sup>

115. The Commission has addressed the funding component of a spent fuel management plan for Xcel’s PINGP and Monticello plant. As Dr. Rakow stated, the Commission’s decommissioning process has established a “reserve fund” to support decommissioning the power plants and the management of the spent fuel within the ISFSIs for a reasonable period after shut down.<sup>134</sup> The reserve fund has been accumulating for many years and contained about \$800 million for the Minnesota jurisdiction as of the end of 2008. This fund is built upon many assumptions, including that Xcel must manage spent fuel for 40 years after initial shut down.<sup>135</sup>

116. OES noted that, in the event that storage beyond the 40-year assumption (and associated funding) becomes necessary, the federal government is responsible for long-term storage. A potential funding source for long-term storage is money awarded to Xcel in its on-going lawsuit against the federal government for breach of contract. To date, the courts have determined that the federal government breached certain

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<sup>127</sup> Ex. 514, Rakow Direct (08-510) at 28.

<sup>128</sup> Ex. 64, Ch. 2, p. 15 (FEIS).

<sup>129</sup> Ex. 58, p. 1 (Staff Briefing Papers in Docket 08-1201); Tr. V 5, pp. 217-218 (Rakow).

<sup>130</sup> Tr. V 2, pp. 142-143 (Bomberger).

<sup>131</sup> Tr. V 5, p. 222 (Rakow).

<sup>132</sup> PINGP Study Group Comment, at 6.

<sup>133</sup> Tr. V. 6, p. 79 (Rakow).

<sup>134</sup> See *ITMO the Matter of Northern States Power Company d/b/a Xcel Energy 2009 Nuclear Plant Decommissioning Accrual*, Commission Docket No. E002/M-08-1201.

<sup>135</sup> OES Exhibit 517 at 4-5 (Rakow 510 Rebuttal).

contracts and have determined Xcel's damages arising from that breach to be \$116.5 million through 2004. Both the federal government and the Commission have additional options to address these costs, such as adjusting the rate structure to increase decommissioning funding.<sup>136</sup>

117. The lack of information regarding decommissioning costs extends to distinguishing between those costs that Xcel must bear due to the uprate and extension and those that Xcel must bear regardless of the outcome of this proceeding. The PINGP Study Group only cites the overall decommissioning costs, and Xcel must pay such costs regardless of the approval of further storage or the uprate. Only the increase in decommissioning costs attributable to the relicensing and power uprate are appropriate for inclusion in the comparative cost modeling. Since no party has investigated such costs, this is not a basis for finding that the cost comparisons are inadequate for purposes of this proceeding.

118. The Renewable Energy Standard (RES) requires that 30 percent of Xcel Energy's retail sales be supplied by qualifying renewable sources by 2020.<sup>137</sup> Of this 30 percent, wind resources must supply 25 percent of retail sales, while other qualifying renewable energy sources can supply the remaining 5 percent. Xcel currently obtains nearly 5 percent of its retail sales from biomass and hydroelectric energy. Xcel expects that its remaining renewable needs will be met with new wind resources.<sup>138</sup>

119. Xcel considered a wind alternative to replace the Prairie Island Plant, but concluded that replacing the 8.5 million megawatt hours from the Prairie Island Plant would require an additional 2,500 MW of wind generating capacity over and above Xcel's existing plans to acquire approximately 2,600 MW of new wind generating capacity needed to meet Xcel's obligation under the RES.<sup>139</sup> Xcel could not reach a conclusion regarding the impact of adding this amount of wind to the system. Based on the variability of wind power, Xcel expressed concern that reliance on wind power to such a large degree could negatively affect system reliability.<sup>140</sup>

120. Another alternative considered was that of no replacement facility being constructed. Xcel pointed out that the need for additional dry cask storage continues even if the Prairie Island Plant ceases operations in 2013 and 2014. Ceasing operation would require that the Prairie Island Plant be decommissioned. In order to decommission the plant, spent fuel must be removed from the reactor and spent fuel pool. Xcel estimates that an additional 39 casks would be required to fully decommission the Prairie Island Plant. As part of the decommissioning process, Xcel Energy would apply to the Commission for a Certificate of Need for additional dry cask storage. Xcel would also have to apply for a Certificate of Need for the additional generation resources capable of providing an equivalent amount of energy, similar

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<sup>136</sup> Tr. V 5 at 220-223 9 (Rakow). See OES Exhibit 517 at 5 and (SRR-R-4)(Rakow 510 Rebuttal).

<sup>137</sup> Minn. Stat. § 216B.1691, subd. 2a(b).

<sup>138</sup> Ex. 100, CN Application at 4-10 to 4-30.

<sup>139</sup> Ex. 134, Wishart Direct (08-510) at 9; Tr. Vol. 4 at 158-60 (Wishart); Ex. 122, Supplemental Filing (08-510) at S5.

<sup>140</sup> Tr. Vol. 4 at 158 (Wishart).

capacity, and equivalent reliability and availability. Such resources would have to be constructed to replace the Prairie Island Plant.<sup>141</sup> Xcel has shown that the no facility alternative is not a reasonable option.

121. In its modeling, Xcel uses the Strategist computer program to assess the impact of the variables in electricity production, demand, and supply to determine the present-value revenue requirements (PVR) for various scenarios. Strategist incorporates the environmental impacts of various alternatives through provided externality values and forecasted emission permit prices.<sup>142</sup>

122. Using Strategist, Xcel evaluated two alternatives to continued operation of the Prairie Island Plant. The first alternative was a 1,260 MW Super Critical Pulverized Coal ("SCPC") plant with 50% carbon sequestration. The second alternative was selected by the program itself without constraints. Strategist selected two natural gas fired combined cycle units with a total capacity of 1,254 MW. Under this analysis, the SCPC plant is \$1.765 billion more expensive than the continued operation of the Prairie Island Plant, and the natural gas combined cycle units are \$1.185 billion more expensive than the continued operation of the Prairie Island Plant.<sup>143</sup> Continued operation of the Prairie Island Plant had the lowest cost of the alternatives evaluated.<sup>144</sup>

123. A number of factors used in Strategist modeling cannot be predicted with certainty, such as base load, fuel cost, externalities, CO2 values, interaction with MISO, and capital cost escalation. To address the potential impact of variations in these costs, Xcel performed seventeen sensitivity analyses to assess the impact of changes in these variables on the overall cost forecasts.<sup>145</sup>

124. Under all of the analyses, continued operation of the Prairie Island Plant remained the least cost alternative by a significant margin. This was the case even under a "very low load" growth sensitivity analysis in which all growth was reduced to zero for five years and then increased by 0.7 percent thereafter. Under this scenario, the cost of continued operation of the Prairie Island Plant was \$439 million less than the next "best" alternative, the natural gas combined cycle units.<sup>146</sup>

125. Xcel contended that the shutdown of the Prairie Island Plant would necessitate replacement of that baseload capacity with electricity generated by coal or natural gas. Such a replacement would result in the emission of pollutants associated with fossil-fueled electricity generation. Emissions of this sort would constitute a

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<sup>141</sup> Ex. 100, CN Application at 4-11.

<sup>142</sup> Ex. 100, CN Application at 4-1 to 4-3.

<sup>143</sup> Ex. 132, Engelking Direct (08-510) at 8, (EME-2), Rev. Table 4-1; Ex. 134, Wishart Direct (08-510) at 11, (SWW-2), Rev. Table 4-1.

<sup>144</sup> Ex. 132, Engelking Direct (08-510) at 7.

<sup>145</sup> Ex. 134, Wishart Direct (08-510) at 11-12, (SWW-2), Rev. Table 4-4; Ex. 100, CN Application at 4-14 to 4-17.

<sup>146</sup> Ex. 134, Wishart Direct (08-510) at 12, (SWW-2), Rev. Table 4-4.

significant increase over the zero carbon emissions from the continued operation of the Prairie Island Plant.<sup>147</sup>

126. In addition to performing an economic comparison of the alternatives considered, Xcel's Strategist model also compared the total system emissions for each alternative evaluated in the model. Emissions included in the analysis were SOx, NOx, CO<sub>2</sub>, CO, Particulate Matter (PM<sub>10</sub>), and Volatile Organic Compounds (VOC). The continued operation of the Prairie Island Plant is projected to result in significantly lower system emissions than the alternatives considered. Replacement of the Prairie Island Plant with two natural gas combined cycle units would result in the addition of more than 92 million tons of carbon compared to continued operation of the Prairie Island Plant. The same analysis for the SCPC showed a forecast of more than 95 million tons of additional carbon being released, compared to the PINGP.<sup>148</sup>

127. The OES analysis of Xcel's cost modeling corrected for a pricing adjustment for the A.S. King facility, added missing externality values, and modified the treatment of short-term purchases.<sup>149</sup> Using these adjusted base values, Dr. Rakow considered changes to mercury costs, the impact of possible baseload power production upgrades at Xcel's Sherco 1 and 2 plants, and the impact of emissions at the Riverside power plant.<sup>150</sup> Since all three of these latter factors introduced a bias against the proposed uprate, Dr. Rakow did not make any adjustments for these factors.<sup>151</sup>

128. Dr. Rakow determined that, when compared to the cost of electricity generated by the Prairie Island Plant, the alternative of wind mixed with non-renewables is more expensive by between \$1.1 billion PVSC and \$2.2 billion PVSC, depending upon the specific scenario. Under base case conditions, the alternative of wind mixed with non-renewables is more expensive than the ISFSI Expansion by about \$1.7 billion PVSC. Dr. Rakow concluded that there are substantial cost advantages to relicensing the PINGP.<sup>152</sup>

129. The alternative scenario of wind mixed with non-renewables would require addition of ten additional wind units and three additional combustion turbine units to Xcel's capacity. Dr. Rakow determined that this scenario would result in system effects, since the alternative of wind mixed with non-renewables does not add the same amount of capacity compared to the relicensing of PINGP. Overall, the wind mixed with non-renewable alternatives option would be more expensive, emit greater quantities of

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<sup>147</sup> Ex. 132, Engelking Direct (08-510) at 10.

<sup>148</sup> Ex. 134, Wishart Direct (08-510) at 12-13, (SWW-2), Rev. Table 4-3.

<sup>149</sup> OES Exhibit 514 at 13 (Rakow 510 Public Direct); OES Exhibit 512 at 13 (Rakow 510 Trade Secret Direct).

<sup>150</sup> OES Exhibit 514 at 12-14 (Rakow 510 Public Direct); OES Exhibit 512 at 12-14 (Rakow 510 Trade Secret Direct).

<sup>151</sup> OES Exhibit 514 at 14 (Rakow 510 Public Direct); OES Exhibit 512 at 14 (Rakow 510 Trade Secret Direct).

<sup>152</sup> OES Exhibit 514 at 19 (Rakow 510 Public Direct); OES Exhibit 515 at (SRR-8) (Rakow 510 Public Direct Attachments).



pollutants, rely more on both natural gas and coal energy, and may require the addition of more new generation facilities than would relicensing and operating the PINGP.<sup>153</sup>

130. As required by Minn. Rules 7855.0120A(2), Xcel assessed the possibility of replacing the output of the PINGP with conservation and demand-side management (DSM). Xcel concluded that these alternatives cannot replace the need for the proposed ISFSI Expansion. OES Witness Christopher T. Davis independently confirmed Xcel's showing that the need for additional dry cask storage at the level of the proposed 1,100 MW PINGP cannot be met more cost-effectively through energy conservation and load management measures.<sup>154</sup> No party challenged OES's testimony regarding conservation and DSM.

131. Strategist does not track emissions of radioactive particles. To address this, Dr. Rakow considered a nuclear externality cost.<sup>155</sup> There are two potential sources of radioactive releases at PINGP: the power plant and the ISFSI. A radioactive release can be categorized as being either due to on-going (i.e., "normal") operations or due to an accident (i.e., "abnormal" operations).<sup>156</sup>

132. For the purposes of this proceeding, Dr. Rakow approached the cost analysis of a nuclear externality as having an impact only if the ISFSI expansion would have an incremental impact on radioactive releases. Dr. Rakow relied upon the estimates in Table 3 on page F-7 of Appendix F of the Petition. These estimates are that workers will be exposed to an incremental annual dose of 4.6 mrem, compared to background radiation level of 240 mrem.<sup>157</sup>

133. Regarding exposure to residents in the vicinity of the Prairie Island Plant, Xcel stated:

... the maximum annual dose to the nearest resident was calculated to be 0.36 mrem/yr. Since it is very unlikely that an annual dose of 0.36 mrem/yr (or less) above the background radiation level of approximately 240 to 300 mrem/yr could be measurable, it is unlikely that the incremental impact on the annual dose to the public during the 20-year license extension of the Prairie Island Nuclear Generating Plant would be measurable.<sup>158</sup>

134. Dr. Rakow concluded that the incremental impact of the proposed ISFSI Expansion on nuclear externalities from on-going operations at the ISFSI is not significant. No further study of the impact of that exposure was conducted in his analysis.<sup>159</sup>

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<sup>153</sup> OES Exhibit 514 at 20 (Rakow 510 Public Direct).

<sup>154</sup> OES Exhibit 503, at 8 (Davis 510 Direct).

<sup>155</sup> OES Exhibit 514 at 19, 22-27 (Rakow 510 Public Direct).

<sup>156</sup> OES Exhibit 514 at 23 (Rakow 510 Public Direct).

<sup>157</sup> OES Exhibit 514 at 24 (Rakow 510 Public Direct).

<sup>158</sup> *Id.*, (quoting Xcel response to OES IR No. 20).

<sup>159</sup> OES Exhibit 514 at 25-26 (Rakow 510 Public Direct).

135. Regarding workers at the Prairie Island Plant, Dr. Rakow relied upon information from Xcel regarding the average “person-dose” of radiation. Based on this data, Dr. Rakow concluded that 110 person-rem is a reasonable estimate of the annual collective dosage.<sup>160</sup>

136. Assuming no insurance, Dr. Rakow calculated the present value cost of the impact on workers assuming: (1) 110 person-rem per year; (2) a \$2,000 per person-rem value set by the NRC; (3) the 20-year period of extended operation; and (4) Xcel’s 7.42 percent discount rate. Dr. Rakow determined that the 20-year present value equaled about \$2.25 million.<sup>161</sup>

137. Dr. Rakow concluded that the \$2.25 million is comparatively small, when compared to the scope of typical economic cost differences relating to PINGP that are in the billions of dollars (PVSC). Since the amount derived may be internalized through health insurance, Dr. Rakow did not consider further the potential cost to workers from potential nuclear externalities caused by on-going operations at the power plant with a 20-year license extension.<sup>162</sup>

138. The OES inquired about the anticipated exposure to the public from the Prairie Island Plant’s ongoing operations. Xcel responded that:

The annual dose to the public is due to direct radiation and liquid and gaseous releases from the plant ... it is not expected that there will be a measurable incremental impact to the annual dose to [the] public during the 20-year license extension period.<sup>163</sup>

139. Dr. Rakow noted that the average impact from liquid and gaseous effluents from the PINGP is 0.0052 mrem/yr for offsite members of the public.<sup>164</sup> Due to the minimal nature of the impact, Dr. Rakow did not consider the issue further in his analysis.<sup>165</sup>

140. Dr. Rakow concluded that the incremental impact of the proposed ISFSI Expansion on nuclear externalities from on-going operations at the power plant is not significant.<sup>166</sup>

141. Dr. Rakow considered the possibility of incremental impact on potential nuclear externalities from an accident at the ISFSI. In response to an OES inquiry (OES IR No. 24) Xcel responded that:

[T]he ISFSI accident analyses in the SAR [Safety Analysis Report] show that either the cask is not damaged or the accident is not credible, thus no

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<sup>160</sup> OES Exhibit 514 at 25 (Rakow 510 Public Direct).

<sup>161</sup> OES Exhibit 514 at 26 (Rakow 510 Public Direct).

<sup>162</sup> *Id.*

<sup>163</sup> *Id.* (quoting Xcel’s response to OES IR No. 22).

<sup>164</sup> *Id.*, (Table 9-7 on page 8-22 of the Petition).

<sup>165</sup> *Id.*

<sup>166</sup> *Id.*

release of radioactive material is expected to occur regardless of the number of casks stored at the ISFSI.<sup>167</sup>

142. Dr. Rakow concluded that there are no incremental costs attributable to potential nuclear externalities caused by an accident at the ISFSI.<sup>168</sup>

143. Dr. Rakow analyzed the incremental impact of the proposed ISFSI Expansion on potential nuclear externalities from an accident at the power plant. Dr. Rakow accepted Xcel's estimate of the present value for severe accident risk as \$4.094 million for PINGP.<sup>169</sup> Dr. Rakow did not find any reason to make an upward revision to the \$4 million present value estimate.<sup>170</sup>

144. Dr. Rakow concluded that the \$4 million is comparatively small, when compared to the scope of typical economic cost differences relating to PINGP ranging from \$0.5 - \$2.2 billion (PVSC). Dr. Rakow concluded that the incremental impact of the proposed ISFSI Expansion on nuclear externalities from an accident at the power plant is not zero, but is too small to impact the analysis in a meaningful manner.<sup>171</sup>

145. The City disputed the adequacy of the assessments by Xcel and the OES of the environmental impacts and costs that could arise from the management of the Prairie Island Plant's spent fuel. Dr. Thompson estimated an externality cost of \$1.160 billion to \$2.310 billion arising from the potential for a fire in the Prairie Island spent-fuel pool during a 20-year period of extended operation of the Prairie Island Plant.<sup>172</sup>

146. Xcel maintained that Dr. Thompson's scenario does not reflect a true externality, in the traditional sense of the term, but rather an insurable risk. Xcel noted that an externality is the cost of an actual effect that is not being borne by the bearer of the other costs of the facility. In contrast, the risk of a future event is not an externality; it is the possibility of a future cost that could possibly be mitigated through insurance.<sup>173</sup> Dr. Rakow confirmed this interpretation.<sup>174</sup>

147. Xcel Energy has substantial insurance coverage.<sup>175</sup> Xcel Energy has property insurance policies in place to cover property damage and the costs associated with site decontamination and cleanup caused by a nuclear accident. The Company carries insurance of \$2.25 billion and has also purchased private insurance in the amount of \$300 million in order to cover potential public liability claims. Xcel contends that claims above \$300 million up to \$10.761 billion would be satisfied by an NRC

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<sup>167</sup> OES Exhibit 514 at 27 (Rakow 510 Direct).

<sup>168</sup> *Id.*

<sup>169</sup> Xcel's Petition at section 4.17.2 of Appendix J of the Petition (aka Appendix E—Environmental Report).

<sup>170</sup> OES Exhibit 514 at 27 (Rakow 510 Public Direct).

<sup>171</sup> *Id.*; Tr. V. 5 at 233 (Rakow).

<sup>172</sup> Ex. 308, Thompson Surrebuttal at 12-13.

<sup>173</sup> Tr. Vol. 4 at 104-05 (Engelking).

<sup>174</sup> See Tr. Vol. 5 at 259 (Rakow).

<sup>175</sup> Tr. Vol. 4 at 104-06 (Engelking); Ex. 129, Bomberger Rebuttal (08-510) at 9.

assessment against all owners of licensed nuclear generating units in accordance with the Price-Anderson Act.<sup>176</sup>

148. Dr. Rakow indicated that, under economic principles, an externality does not exist if the cost of an accident is covered by insurance.<sup>177</sup> Dr. Thompson agreed that if a cost is fully covered by insurance, it is not an externality cost.<sup>178</sup> Dr. Thompson's estimated externality cost of a spent-fuel pool fire of between \$1.160 billion to \$2.310 billion is potentially fully covered by insurance under the Price-Anderson Act. For the purposes of this proceeding, the financial impact of a catastrophic accident is not an externality that must be included in the analysis under Minn. R. 7855.0120 B.

149. Xcel Energy and the OES have considered a variety of potential alternatives to the continued operation of the Prairie Island Plant. None of the alternatives would be reasonable or prudent choices over continued operation of the Prairie Island Plant.

150. The foregoing economic analysis applies with equal weight to the application for a CON for the proposed power uprate. Xcel demonstrated that a need exists for the increased capacity and associated energy provided by the proposed power uprate, even under the unlikely assumption that there would be no future growth in energy and demand through 2034. Xcel also demonstrated that denial of the proposed power uprate would require Xcel either to build or buy replacement baseload capacity and associated energy.<sup>179</sup>

151. Xcel showed that the consequences of denying the uprate CON are that (a) the costs of a reasonable replacement would be greater than the cost of the proposed uprate, and (b) the cost of energy that would be supplied by a reasonable replacement would be greater than the cost of energy to be supplied by the proposed power uprate.<sup>180</sup>

## **2. ISFSI Alternatives**

152. Xcel assessed off-site alternatives to the proposed additional dry cask storage to accommodate operation of the Prairie Island Plant through 2033-2034. Xcel determined that none of these alternatives were viable alternatives to on-site interim storage. The alternatives considered are: (1) reprocessing of spent fuel; (2) contracting for additional spent fuel storage capacity at an existing spent fuel storage facility; (3) developing an interim spent fuel storage facility in Utah; and (4) availability of a federally sponsored repository for spent fuel at Yucca Mountain.<sup>181</sup> No party has demonstrated that there is a more reasonable and prudent off-site alternative to the proposed ISFSI.

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<sup>176</sup> Ex. 129, Bomberger Rebuttal (08-510) at 9-10.

<sup>177</sup> Tr. Vol. 5 at 259 (Rakow).

<sup>178</sup> Tr. Vol. 3 at 43 (Thompson).

<sup>179</sup> OES Exhibit 510 at 33-34 (Rakow 509 Public Direct).

<sup>180</sup> *Id.*

<sup>181</sup> Ex. 100, CN Application at 5-2.

153. There are currently no reprocessing facilities in the United States. Reprocessing is not a viable alternative to establishing on-site dry cask storage at the Prairie Island Plant. The reprocessing of nuclear facilities in France occurs at plants using a by-product that cannot be used at Prairie Island.<sup>182</sup>

154. The only facility currently storing spent fuel on a contract basis from commercial nuclear power reactors is the General Electric Morris facility in Morris, Illinois. There are no spent fuel assemblies from the Prairie Island Plant currently being stored at that facility. The General Electric Morris facility is no longer accepting spent fuel from commercial nuclear power plants and is not a viable alternative to increasing the dry cask storage at the Prairie Island Plant.<sup>183</sup>

155. Xcel is pursuing creation of private, temporary away-from-reactor storage in Utah as a member of Private Fuel Storage ("PFS"). PFS is a consortium of eight utilities, including Xcel, that is working to build a spent fuel storage facility on the west central Utah reservation of the Skull Valley Band of Goshute Indians. PFS and the Skull Valley Band of Goshute Indians entered into an agreement in December 1996 that allows for temporary storage of spent fuel from commercial nuclear power plants. The NRC approved the license for PFS on September 9, 2005. In September 2006, the United States Department of Interior ("DOI") disapproved the PFS-Goshute lease and the use of public lands for an Intermodal Transfer Facility, which was to be used for a rail spur from the mainline to the storage facility.

156. On July 17, 2007, PFS and the Skull Valley Band of Goshute Indians filed a complaint in the United States District Court challenging the DOI's decision. Regardless of the outcome of that suit, the project faces further obstacles. The State of Utah remains opposed to the project. The viability of PFS will also depend on the interest and commitment to use the facility by other utilities with spent nuclear fuel. At this time, the partners in PFS do not have plans to construct and open the facility. Due to the considerable uncertainty surrounding the project, PFS is not a viable alternative to additional spent fuel storage at the Prairie Island Plant.<sup>184</sup>

157. The United States Department of Energy ("DOE") submitted a license application to the NRC in 2008 to proceed with construction of the Yucca Mountain repository. The DOE has indicated that the earliest Yucca Mountain might be available to begin accepting spent fuel would be in 2020. However, it is likely that legal challenges will delay the licensing process and that additional time will pass before Yucca Mountain will be constructed. Recently, the Obama Administration issued its recommended federal budget for 2010 (FY2010 Budget). In the FY2010 Budget, funding for Yucca Mountain is proposed to be significantly reduced. At the level of funding proposed, the DOE would only be able to respond to NRC inquiries during its review of the DOE's application to construct Yucca Mountain. This level of funding is likely to delay further DOE's ability to begin accepting spent fuel at the facility.

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<sup>182</sup> Ex. 100, CN Application at 5-3; Public Hearing (afternoon) Testimony of Terry Perkins, at 83-85.

<sup>183</sup> Ex. 100, CN Application at 5-3.

<sup>184</sup> Ex. 100, CN Application at 5-3 to 5-4; Ex. 128, Bomberger Direct (08-510) at 22-24.

158. In addition to the implications of the funding decisions in the FY2010 Budget, the Obama Administration has indicated an interest in devising a new strategy toward nuclear waste disposal. Xcel expressed its belief that the federal government will, at some point in the future, meet its contractual obligation to remove spent fuel from the Prairie Island Plant. Xcel maintains that this future event will not occur in time to eliminate the need for the on-site storage for which this Certificate of Need was requested.<sup>185</sup>

159. Xcel considered on-site non-cask storage alternatives as an alternative to the proposed additional dry cask storage. Rod consolidation is not a viable alternative to dry cask storage at the Prairie Island Plant. Rod consolidation can only nominally increase pool storage capacity and poses risks of occupational radiation exposure through time-consuming and labor-intensive fuel-handling activities. Rod consolidation additionally generates significant amounts of radioactive waste and is not widely used in the industry. Northern States Power conducted a demonstration project at the Prairie Island Plant in 1986 and found that the predicted compaction ratios for assembly hardware were not achievable and the occupational dose of radiation was significantly higher than predicted because workers were subject to increased exposure from the many time-consuming and labor-intensive fuel-handling activities. The Prairie Island Plant study also found that consolidation would generate significant amounts of radioactive debris.<sup>186</sup>

160. Increasing storage pool capacity by rearranging the spent fuel assemblies into a smaller area (re-racking) is not a viable option because re-racking would not provide sufficient additional storage to support 20 years of extended operations. Re-racking has already been performed twice at the Prairie Island Plant, once in 1977 and again in 1981. The current licensed storage capacity of the spent fuel pool is 1,386 assemblies. A 1995 study concluded that it might be possible to gain up to 790 storage cells within the Prairie Island Plant's spent fuel pool through re-racking. An increase in wet storage of 790 spent fuel assemblies is not sufficient additional storage to support 20 years of extended operations.<sup>187</sup>

161. Construction of a new spent fuel storage pool also was examined by Xcel Energy. Under this alternative, a new spent fuel storage pool and building licensed and regulated by the NRC would be designed and constructed. The new pool would require a transfer cask to transfer spent fuel assemblies from the existing pool to the new pool. Under this alternative, the number of times the spent fuel assemblies are handled would triple: first, to place them in the transfer cask to move them to the new pool; second, to remove them from the transfer cask to place them in the new storage pool; and third, to place them into a dry cask for storage offsite. Design, construction, and licensing would take an estimated five years. A new storage pool would require the same components as the existing pool and would rely on active cooling rather than passive cooling. These components would include storage racks, pool cooling and filtration systems, pool

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<sup>185</sup> Ex. 100, CN Application at 5-5 to 5-7; Ex. 128, Bomberger Direct (08-510) at 21-22.

<sup>186</sup> Ex. 100, CN Application at 5-7 to 5-8.

<sup>187</sup> Ex. 100, CN Application at 5-8; Ex. 135, Samson Direct at 8-9.

bridge crane and fuel assembly handling tools, building ventilation systems, radiation monitoring equipment, and a cask decontamination area. This alternative was evaluated in the 1991 Prairie Island Certificate of Need Application. The estimates of project costs in 1991 were on the order of \$31 million to build, \$0.5 million per year to operate, and \$50 million to decommission the pool. This estimate did not include costs associated with purchasing hardware or plant personnel to load and transport the spent fuel to Yucca Mountain when the facility becomes available.<sup>188</sup>

162. The on-site non-cask storage alternatives considered by Xcel do not provide a viable alternative to the proposed additional dry cask storage for which a Certificate of Need is sought.

163. For dry storage of spent nuclear fuel, there are currently four types of storage system technologies available. All four systems rely on passive cooling to remove decay heat from the spent fuel. The four technologies vary in the manner in which they store the spent fuel, how they accommodate the transfer of spent fuel from the power plant, and how they are transported. The four types of systems are: (1) noncanisterized storage system; (2) horizontal canisterized storage system; (3) vertical canisterized storage system; and (4) modular vault dry storage system.<sup>189</sup>

164. The non-canisterized system is the system currently used for storing fuel at the Prairie Island ISFSI. The advantages of this system are as follows. This system has been in use at the Prairie Island Plant since 1994 with the use of the TN-40 cask. The new cask (TN-40HT) is being designed and licensed for both storage and shipping, eliminating the need to transfer spent fuel between different casks. The casks can be loaded for shipment offsite without having to repackage the fuel assemblies in the spent fuel pool or transfer a cask. No welding is required, which reduces loading time and associated worker doses during the loading phase. Construction costs to expand the ISFSI concrete pads will be minimal, and changes are not required until 2020. The Prairie Island Plant has all the necessary equipment, procedures, and experience to safely load and transfer a cask to the ISFSI. The disadvantage of using the non-canisterized system is that a pressure monitoring system is required to ensure no leakage of O-ring seals in bolted storage cask lids.<sup>190</sup>

165. Xcel also considered a horizontal canister storage system, a vertical canisterized storage system, and a modular vault dry storage system.<sup>191</sup> Xcel selected the non-canisterized system currently in use at the ISFSI over the alternatives for several reasons. The proposed non-canisterized system is more cost-effective over the relicensing period than the other technologies considered. The system has been in use at the Prairie Island Plant for more than 10 years without a safety issue. The Prairie Island Plant already has all of the equipment, procedures, and infrastructure needed to safely load and transport a cask to the ISFSI. The system is simpler than most of the alternatives and can hold a relatively higher number of fuel assemblies (40 vs. 24),

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<sup>188</sup> Ex. 100, CN Application at 5-9.

<sup>189</sup> Ex. 100, CN Application at 5-9 to 5-10.

<sup>190</sup> Ex. 100, CN Application at 5-10 to 5-12.

<sup>191</sup> Ex. 100, CN Application at 5-12 to 5-22.

which reduces the number of casks/canisters that must be loaded, transferred, and stored in the ISFSI. Additionally, the ISFSI is already designed to accommodate 48 TN-40 style casks, and there will be only 29 casks on-site at the end of the current operating licenses. For this reason, use of this option means that new ISFSI construction would not be necessary until approximately 2020.<sup>192</sup>

166. Xcel considered alternatives of a different size to the proposed project. The proposal for 35 additional casks is intended to support the 20-year license renewal period. Xcel maintained that, due to the uncertainty surrounding when off-site storage alternatives might become available, the only way to ensure that the Prairie Island Plant is available on a reliable basis is to expand the storage capacity to accommodate the number of dry-storage casks necessary for the full 20 years. Xcel noted that, if the expansion is not granted to support an additional 20 years of operation, some additional storage will still be necessary to support decommissioning. The footprint of the existing ISFSI will accommodate either outcome without changing the size of the existing ISFSI.<sup>193</sup>

167. Xcel has shown that its proposed non-canisterized dry storage system technology is superior to alternative dry cask storage technologies for use at the Prairie Island Plant.

168. Under Minn. Stat. § 116C.83, subd. 4b, any authorization for spent nuclear fuel storage, pending transfer to a permanent storage site, is limited to the plant site at which the fuel is consumed. To extend the operation of the Prairie Island Plant, additional dry cask storage must be established on the Prairie Island Plant site. Xcel analyzed locations at the Prairie Island Plant for suitability for additional cask storage as part of the Application for a Certificate of Need dated April 29, 1991 (and revised June 10, 1991). The location of the existing dry cask storage facility was determined in the 1991 Certificate of Need process. Since sufficient room exists to accommodate the additional storage within the footprint of the existing dry cask storage area, Xcel maintains that construction of a new ISFSI at an alternative site is not necessary.<sup>194</sup>

169. Xcel Energy also evaluated the no facility alternative. If a Certificate of Need is not granted, the Prairie Island Plant cannot operate beyond 2014 and would be forced to shut down. To complete the decommissioning process, spent fuel would have to be removed from the reactor and spent fuel pool, which would also require additional on-site dry cask storage. Denying a Certificate of Need for additional dry cask storage that would allow the Prairie Island Plant to continue operating does not obviate the need for additional on-site storage, but only changes the purpose of dry cask storage from continued operations support to decommissioning support.<sup>195</sup>

170. City witness Dr. Thompson maintained that Xcel's assessment of alternatives was inadequate, stating:

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<sup>192</sup> Ex. 100, CN Application at 5-12.

<sup>193</sup> Ex. 100, CN Application at 5-1 to 5-2, 5-24.

<sup>194</sup> Ex. 100, CN Application at 5-2, 5-24.

<sup>195</sup> Ex. 100, CN Application at 5-2.



First, the most probable outcome regarding management of Prairie Island spent fuel is that the fuel will be stored at the Prairie Island site for the indefinite future, potentially for one or more centuries. The spent fuel could remain in the custody of Xcel Energy or its successors throughout that period. Costs and environmental impacts would accrue throughout the storage period.<sup>196</sup>

171. Dr. Rakow noted that Dr. Thompson had raised this same issue in the Monticello ISFSI proceeding (Docket No. E-002/CN-05-123). In both the Monticello proceeding and this matter, Dr. Rakow noted that extended storage costs would be fixed costs, and therefore would be added to every alternative. Dr. Rakow also testified that since long-term storage is an obligation of the federal government, it would be reasonable to assign a zero cost to indefinite storage in this proceeding.<sup>197</sup> Even with the assumption that the costs of indefinite storage were variable rather than fixed costs, Dr. Rakow demonstrated that the present value of such costs would be so small as to have no impact on the analysis of alternatives in this proceeding.<sup>198</sup> Any costs arising from extended storage at the Prairie Island Plant do not change the outcome of economic analysis of storage alternatives.

172. Xcel Energy has analyzed a comprehensive list of alternatives to the proposed additional dry cask storage. No alternative to the proposed additional dry cask storage has been shown to be more reasonable or prudent than Xcel's proposal

### **3. Uprate Alternatives**

173. The record shows that the proposed extended power uprate is superior to renewable alternatives in terms of cost, emissions and number of new generation facilities.<sup>199</sup>

174. The renewable alternatives to the extended power uprate would be more expensive, emit greater quantities of pollutants, rely more on both natural gas and coal energy, and may require the addition of more new generation facilities than would be required if the extended power uprate was approved.<sup>200</sup>

## **C. Are the Consequences of Granting the Certificates of Need More Favorable to Society than the Consequences of Denying It?**

### **1. Relationship of Continued Operation of the Prairie Island Plant to Overall Energy Needs.**

175. Denial of a CON for the proposed storage facility would mean that the Prairie Island Plant would shut down in 2013-2014 and decommissioning would be

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<sup>196</sup> Ex. 307, Thompson Rebuttal at 3.

<sup>197</sup> Ex. 517, Rakow Rebuttal (08-510) at 2-3.

<sup>198</sup> Ex. 517, Rakow Rebuttal (08-510) at 3; (SRR-1).

<sup>199</sup> OES Exhibit 510 at 19-20, 27 (Rakow 509 Public Direct).

<sup>200</sup> OES Exhibit 510 at 21 (Rakow 509 Public Direct).

commenced. With the Prairie Island Plant shut down, Xcel would lose 1,100 MW per year of capacity that would have to be replaced. As discussed above, that capacity would likely be replaced with baseload plants powered by coal or natural gas.<sup>201</sup>

176. Xcel maintained that continued operation of the Prairie Island Plant diversifies Xcel's generation portfolio. As a result, Xcel is less affected by fluctuations in the cost of natural gas. Xcel also noted that future environmental regulations could impose costs on carbon emissions, which would not affect the Prairie Island Plant.<sup>202</sup>

177. Xcel noted that the project uses an existing power plant site, which allows Xcel Energy to avoid constructing a new power plant at a greenfield site.<sup>203</sup> While it was noted that the Prairie Island Plant could be converted to natural gas, the Prairie Island Plant would need to be shut down during the conversion process, denying Xcel the ability to produce electricity during the conversion period.

178. OES witness Hwikwon Ham testified that the project will have a positive impact in meeting the state's energy needs.<sup>204</sup>

## **2. Effects Upon Natural and Socioeconomic Environments.**

179. The additional dry cask storage will have minimal impact on the natural environment. The additional casks will be located completely within the boundary of the existing ISFSI site. Neither the Prairie Island Plant nor the ISFSI site footprint will be expanded. No greenfields will be affected by approval of Xcel's application. While additional storage will require the construction of two concrete storage pads within the ISFSI site, Xcel will not be required to construct or modify any building, footprint, access roads, parking areas, or lay down areas to support the project. The Uprate project will use existing transmission facilities to transport electricity from the plant to the electrical grid.<sup>205</sup>

180. The Prairie Island Plant does not emit significant levels of any of the criteria pollutants or greenhouse gases that are emitted from coal or other fossil fuel burning plants. If additional storage capacity for spent nuclear fuel is not obtained, Xcel Energy would be forced to shut down the plant starting in 2013.<sup>206</sup> Replacement of the Prairie Island Plant with the "best" replacement of two 600 MW combined cycle units powered by natural gas would result in a substantial increase in emission of air contaminants, in particular, the emission of an additional 92 million tons of carbon.<sup>207</sup>

181. There will be no radioactive wastes produced or released by operation of the ISFSI. The spent fuel is stored in metal casks (both TN-40 and TN-40HT) that are sealed and closed to ensure that no radioactive materials can escape. In addition, the

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<sup>201</sup> Ex. 132, Engelking Direct (08-510) at 10.

<sup>202</sup> Ex. 100, CN Application at 10-2.

<sup>203</sup> Tr. Vol. 4 at 83 (Engelking).

<sup>204</sup> Ex. 506, Ham Direct (08-510) at 6.

<sup>205</sup> Ex. 100, CN Application at 10-2 to 10-3.

<sup>206</sup> Ex. 100, CN Application at 10-3; Ex. 134.

<sup>207</sup> Ex. 134 (Wishart Direct) (08-510) at 7 and (SWW-2), Rev. Table 4-3.

casks are continually monitored to ensure that the inert helium gas inside the cask has not escaped. There is no liquid, solid, or gaseous radioactive waste associated with the ISFSI and no release to or contamination of the groundwater.<sup>208</sup> There is no potential for the operation of the ISFSI to result in groundwater contamination.<sup>209</sup>

182. Spent nuclear fuel generates ionizing radiation. The TN-40 and TN-40HT casks are designed with appropriate materials, and have sufficient thickness, to keep dose levels within the requirements specified in 10 C.F.R. Part 20 and 10 C.F.R. Part 72. In addition to the heavy shielding of the spent fuel provided by the TN-40 and TN-40HT casks, an earthen berm surrounds the ISFSI, providing substantial additional shielding of direct radiation. The berm is a minimum of 17 feet high. The berm essentially eliminates the direct radiation component of both neutron and gamma radiation, leaving only “skyshine” radiation, or radiation that travels upwards from the storage casks and is reflected back down to the ground off the atmosphere, which represents a small fraction of the total radiation emitted from a cask.<sup>210</sup>

183. The PINGP Study Group maintained that the ISFSI will exceed the cancer risk allowable under Minn. R. 4717.7820, subp. 4, and 4717.8050, subp. 3. The FEIS notes that the additional lifetime cancer risk to the public resulting from “skyshine radiation” from 64 casks at the PINGP ISFSI is 2.8 in 100,000.<sup>211</sup> This additional lifetime cancer risk increases more than ten-fold to 35 in 100,000 when the number of spent fuel storage casks reaches 98.<sup>212</sup>

184. The dry cask storage is a passive system that emits no radioactive effluents,<sup>213</sup> and the casks and earthen berm surrounding the ISFSI greatly minimize direct radiation to the public.<sup>214</sup> A conservative estimated annual dose to the nearest permanent resident with 64 casks placed on the ISFSI, and assuming implementation of the extended power uprate, is 0.36 mrem/yr.<sup>215</sup> This dose is a small fraction of the NRC’s regulatory limits for radiation exposure to the general public – 100 mrem/yr from all man-made sources and 25 mrem/yr from ISFSI operations – and is indistinguishable from natural background radiation and decreases with distance from the ISFSI.<sup>216</sup>

185. Radioactive material associated with the spent fuel to be stored is completely contained in the casks, so that no radioactive material is released from the spent fuel to the environment under both normal and postulated accident conditions (e.g., earthquakes, tornadoes, fires, etc). This prevents inhalation or ingestion of radioactive material by Xcel personnel working onsite or people living nearby. This containment also prevents contamination of soil in the vicinity of the site.<sup>217</sup> The

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<sup>208</sup> Ex. 100, CN Application at 7-31.

<sup>209</sup> Ex. 135, Samson Direct at 15.

<sup>210</sup> Ex. 100, CN Application at 7-37.

<sup>211</sup> Ex. 64, Ch. 2, p. 26, Table 5A-2 (FEIS).

<sup>212</sup> Id., Ch. 2, p. 37, Table 5A-2.

<sup>213</sup> Ex. 64, FEIS, Ch. 2 at 24.

<sup>214</sup> Ex. 64, FEIS, Ch. 2 at 24-25; Tr. Vol. 4 at 216 (Samson).

<sup>215</sup> Ex. 135, Samson Direct at 15; Tr. Vol. 4 at 218 (Samson).

<sup>216</sup> Ex. 64, FEIS, Ch. 2 at 25.

<sup>217</sup> Ex. 100, CN Application at 7-32.

limitations in Minn. Rules 4717.7820, subp. 4, and 4717.8050, subp. 3, apply to discharges to air and water that can be ingested, thereby creating a cancer risk. Those rules do not apply to the effects of ionizing radiation. The standards for such exposure are set by the NRC and the ISFSI complies with those standards.

186. The Community and the PINGP Study Group maintained that there are dangerous amounts of radiological contaminants currently associated with PINGP's existing operations, which already exceed allowable levels.<sup>218</sup> The Community asserts that the amount of radium-226 detected in the vicinity of the Prairie Island Plant is 20 times higher than the Maximum Contaminant Level ("MCL") of 5 pCi/L.<sup>219</sup> Regarding sufficiency of testing for these contaminants, the PINGP Study Group stated:

Minnesota Department of Health ("MDH") Environmental Monitoring Reports test water in only one well and at only one downstream location, the Lock and Dam No. 3 site a mile from the Nuclear Plant. The MDH Report suggests either that radium-226 is at 96 pCi/L at the downstream sampling site, or that that monitoring procedures are incapable of detecting radium-226 in water unless radium-226 exceeds this level, nearly twenty times the concentration allowable under applicable law.<sup>220</sup>

187. The PINGP Study Group argues that multiple samples and adequate monitoring procedures to demonstrate that "cask expansion and continued operation of the Nuclear Plant would comply with radium and gamma radiation limits" should be in place before the Certificate of Need is issued.<sup>221</sup>

188. The levels of radium-226 reported in the MDH Environmental Monitoring Report 2007-2008 are the lowest values detectable by the gamma detection system. These reported values are not the actual levels of radium-226 measured by the MDH, which were below the detectable level. Due to the properties of radium-226 as an alpha emitting radionuclide, the best indicator of the amount of radium-226 in a sample is the gross alpha result.<sup>222</sup> All of the gross alpha values reported in the MDH Report are below the EPA's 15 pCi/L MCL for gross alpha.<sup>223</sup>

189. The level of radium-226 in the Mississippi River does not exceed applicable limits. There is no basis for requiring additional testing equipment or procedures for this contaminant as a condition to granting the Certificate of Need.

190. The shielding provided by the casks is insufficient to prevent all radiation exposure to Xcel personnel during spent fuel handling, cask loading, preparing casks for storage, onsite transport operations, and placement of the casks at the ISFSI. Xcel

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<sup>218</sup> Community Brief, at 32-34; PINGP Study Group Comment, at 21-22.

<sup>219</sup> Community Initial Brief at 34-35.

<sup>220</sup> MDH Environmental Monitoring Report (Table 10) at <http://www.health.state.mn.us/divs/eh/radiation/radioactive/environmental.pdf>, cited in Prairie Island Indian Community Initial Brief, pp. 33-34.

<sup>221</sup> PINGP Study Group Comment, at 22-23.

<sup>222</sup> Ex. 180, Zelenak Affidavit, Attachment 1.

<sup>223</sup> Xcel Energy Supplemental Reply Brief at 3; Ex. 180, Zelenak Affidavit, Attachment 1.

has committed to meeting the requirements of 10 C.F.R. Part 20 for protecting personnel from radiation exposure and minimizing exposures during all activities related to spent fuel storage.<sup>224</sup>

191. Radiological exposures and doses to personnel at the Prairie Island Plant are monitored and controlled in accordance with the Prairie Island Plant's radiation protection program. Xcel follows the NRC regulations regarding such exposures, which are kept as low as reasonably achievable ("ALARA") through design and operational procedures. Radiation exposures to Prairie Island Plant personnel from all operations at the Prairie Island Plant have decreased over time and currently average approximately 111 person-rem annually.<sup>225</sup> Personnel doses are individually monitored and tracked to ensure compliance with NRC regulations and are projected to remain below federal regulatory limits with the additional dry cask storage.<sup>226</sup>

192. There has been no showing in this record of credible events that could result in releases of radioactivity from the TN-40 or TN-40HT cask cavity, or result in unacceptable increases in direct radiation due to loss of cask shielding. Xcel maintains that for this reason, area radiation and airborne radioactivity monitors are not required at the ISFSI.<sup>227</sup>

193. Xcel maintains 20 thermoluminescent dosimeters ("TLDs") that record radiation levels near the ISFSI on a continuous basis (12 TLDs are located inside and 8 TLDs are located outside the earthen berm) as well as pressurized ion chambers that monitor radiation from the ISFSI and provide real time measurements to the Minnesota Department of Health ("MDH").<sup>228</sup> Workers and visitors entering the storage facility are provided with dosimetry to measure and record radiation dose exposure accurately.<sup>229</sup>

194. The ISFSI contains no systems that process non-radioactive solids or liquids. There are no water or sewage services at the ISFSI. Dry storage of spent fuel is a passive method of handling spent fuel that requires no water resources for cooling. Ambient air is used for natural convective cooling of the fuel casks. Due to the sealed containment of the spent fuel, ambient air is neither consumed nor contaminated while performing this function.<sup>230</sup>

195. The spent fuel storage casks are exposed to precipitation in the ISFSI. Each spent fuel storage cask is thoroughly decontaminated and tested before it is placed in the ISFSI.<sup>231</sup> No radioactive wastes are produced or released by operation of the ISFSI facility.<sup>232</sup> There are no liquid, solid, or gaseous radioactive releases

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<sup>224</sup> Ex. 100, CN Application at 7-32.

<sup>225</sup> Ex. 64, FEIS, Ch. 2 at 26.

<sup>226</sup> Ex. 64, FEIS, Ch. 2 at 26-27, 67.

<sup>227</sup> Ex. 100, CN Application at 7-37.

<sup>228</sup> Tr. Vol. 6 at 298-300 (Pickens); Ex. 173, 2008 REMP Report for Prairie Island at 18.

<sup>229</sup> *Id.*

<sup>230</sup> Ex. 100, CN Application at 7-38.

<sup>231</sup> Tr. Vol. 4 at 223 (Samson).

<sup>232</sup> Ex. 135, Samson Direct at 15.

associated with operation of the ISFSI, and therefore, there is no potential for groundwater contamination from operation of the ISFSI.<sup>233</sup>

196. Additional dry cask storage in the ISFSI will not add any wastes to storm water. For this reason, it is reasonable to expect that quality of runoff from the ISFSI will be similar to the existing runoff quality, while the quantity of runoff may slightly increase. This runoff will be directed toward natural flow routes around the facility. Energy absorbing controls such as riprap and sediment controls will be used to minimize erosion into these natural flow routes.<sup>234</sup>

197. Construction of the new storage pads will require the excavation of approximately 864 cubic yards of existing aggregate and subsoil within the ISFSI, and Xcel Energy will coordinate with the Minnesota Pollution Control Agency ("MPCA") as to the permit(s) required.<sup>235</sup>

198. Emissions during construction and from infrequent vehicular traffic will not result in significant effects on air quality at the ISFSI site. The only sources of fugitive dust will be from construction activities and will be controlled by wetting exposed soil areas and covering stockpiles. During operation of the ISFSI, the only fugitive dust source will be that produced by the train car during the infrequent delivery of casks to the site. This is reasonably considered to be a negligible source of fugitive dust.<sup>236</sup>

199. During normal operation, the ISFSI has no ongoing activities that could result in the generation of sound. The ISFSI will have no noise impact on the area. Adding dry cask storage capacity will not result in any increase in sound levels during operation. When spent fuel is moved from the plant to the concrete pad there is some noise impact due to the operation of a truck or front end loader. The construction and operational sound levels of the facility will be above the existing residential daytime L90 sound levels but well below the Minnesota daytime code limit of an L50 of 60 dBA.<sup>237</sup>

200. During operation, there will be no increase in traffic since there are no additional full time workers at the ISFSI. When casks are moved to the ISFSI (typically a week-long process) the only vehicle added to the facility will be the cask transport vehicle. This vehicle operates solely on the plant property. No other significant traffic increases are expected during operation of the ISFSI.<sup>238</sup>

201. Construction of the two new pads will consist of earthwork, structural fill and concrete materials being brought to the site, delivery of equipment and supplies, and daily construction workers commuting to the site in the morning and afternoon on

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<sup>233</sup> Ex. 64, FEIS, Ch. 2 at 24; Ex. 135, Samson Direct at 15.

<sup>234</sup> Ex. 100, CN Application at 7-46 to 7-47.

<sup>235</sup> Ex. 64, FEIS, Ch. 2 at 18.

<sup>236</sup> Ex. 100, CN Application at 7-38 to 7-39.

<sup>237</sup> Ex. 100, CN Application at 7-40 to 7-43.

<sup>238</sup> Ex. 100, CN Application at 7-50.

work days during an assumed shift length of eight hours, at least five days a week, for a duration of a few weeks.<sup>239</sup>

202. The potential for ambient environmental impact from the proposed power uprate was also assessed. OES Information Request No. 15 requested information on the off-site population dose due to the incremental impact of the extended power uprate on the ongoing operations of the power plant. Xcel responded that there are three primary release paths: liquid effluents, gaseous effluents, and direct radiation. The Company explained that the quantity of releases can be bounded by multiplying the EPU's 10 percent increase in thermal power by the current average level of releases. Using this method, Xcel calculated the maximum release and concluded that any expected radiation dose would be "so small it will not be distinguishable from normal background radiation levels."<sup>240</sup>

203. The Community and the PINGP Study Group note that significant levels of tritium continue to be detected in two groundwater wells on the Prairie Island Nuclear Plant property, wells P-10 and MW-8. The levels of tritium in these wells fluctuate widely, with concentrations going as high as 2,060 pCi/L at P-10 in 2008, 3,773 pCi/L at P-10 in 2006 and as high as 781 pCi/L at MW-8 in 2008.<sup>241</sup> Background tritium levels range from the 20s to the 40s.<sup>242</sup> Tritium levels found by current monitoring are as much as a hundred times higher than background levels. While these observed levels are insufficient to result in an environmental impact, the ongoing presence of tritium supports additional monitoring which will be discussed in subsequent Findings.

204. The proposed Extended Power Uprate will result in a very small, unmeasurable incremental increase in radiation releases. Xcel estimated that a 10 percent increase in thermal power would result in an increase of 0.00026 mrem/year from liquid effluents for a member of the public, and the incremental dose for gaseous effluent is the same.<sup>243</sup> This dose is indistinguishable from background radiation.<sup>244</sup>

205. The record in this proceeding on the issue of socioeconomic and natural environment impacts of the extended power uprate is very similar to that in the Monticello extended power uprate proceeding. In the Monticello matter (Commission Docket No. E002/CN-08-185), the Commission granted the CON for that uprate, adopting the ALJ's conclusion that "[t]he uprate will not result in radiological levels above the safe thresholds established by the NRC[.]"<sup>245</sup> No socioeconomic or natural environment impacts have been shown to arise from Xcel's proposed extended power uprate at the Prairie Island Plant.

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<sup>239</sup> Ex. 100, CN Application at 7-49.

<sup>240</sup> OES Exhibit 510 at 26 (Rakow 509 Public Direct).

<sup>241</sup> See Ex. 173 p. E-3 (2008 REMP); Community Initial Brief, p. 21.

<sup>242</sup> Tr. V 6, p. 207 (Flowers).

<sup>243</sup> OES Exhibit 510 at 26 (Rakow 509 Public Direct).

<sup>244</sup> OES Exhibit 510 at 25-27 (Rakow 509 Public Direct).

<sup>245</sup> *ITMO the Application of Northern States Power Company, a Minnesota Corporation, for a Certificate of Need for the Monticello Nuclear Generating Plant Extended Power Uprate*, Docket No. E-002/CN-08-185 (ALJ Findings of Fact No. 94 at 18).

### 3. Effects Upon Future Development.

206. Continued operation of the Prairie Island Plant will ensure the continued employment of workforce at the plant. The Prairie Island Plant employs over 600 people in permanent positions. The jobs at the plant require significant skills and are well compensated. This employment benefits the entire community in the area.<sup>246</sup> At the public hearings, several individuals, including John Howe, the Mayor of Red Wing, recognized the value Xcel Energy and its employees provide to the community.<sup>247</sup> During the construction of the ISFSI expansion, Xcel will employ a number of construction workers. These highly skilled, well-compensated positions would add significant limited-time economic benefit to the local community.<sup>248</sup>

207. The continued operation of the Prairie Island Plant allows Xcel to continue to serve its customers' energy needs reliably while maintaining favorable rates to support future economic development in Minnesota and the surrounding states. Continued operation of the Prairie Island Plant will result in lower energy costs as compared to the alternatives, resulting in a stronger regional economy.<sup>249</sup>

208. Continued operation of the Prairie Island Plant also provides significant local, state, and federal tax benefits. The continued operation of the Prairie Island Plant will result in increased state and federal income taxes paid by the Company over the 20-year continued operation of the Prairie Island Plant.<sup>250</sup> Xcel notes that a considerable increase in local property tax payments will arise from the significant investment that will occur at the Prairie Island Plant to continue operations and install the equipment necessary for the proposed uprate. Xcel projected that the continued operation of the Prairie Island Plant will result in an additional \$12,380,000 in property taxes paid to Goodhue County, an additional \$15,859,000 in property taxes paid to the City, and an additional \$6,884,000 in property taxes paid to School District 256, over the period 2010 to 2017, as a result of continued operations (not including the proposed extended power uprate). In total, Xcel projected property tax payments to all taxing entities would increase by \$37,438,000 over the years 2010 to 2017 due to continued operation of the Prairie Island Plant.<sup>251</sup>

209. An Emergency Response Plan (ERP) is an important safety requirement of the NRC.<sup>252</sup> The ERP represents the coordinated effort of the NRC and the appropriate local, county, state, and federal authorities.<sup>253</sup> An effective ERP will suppress, contain and mitigate any incident at the PINGP and prevent it from expanding into an incident of greater proportions that may challenge or impact the PINGP as a

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<sup>246</sup> Ex. 100, CN Application at 10-3 to 10-4.

<sup>247</sup> Public Hearing (Evening) Tr. at 56; Exs. 36-40.

<sup>248</sup> Ex. 100, CN Application at 10-4; see Ex. 64, FEIS, Ch. 2 at 21.

<sup>249</sup> Ex. 132, Engelking Direct (08-510) at 12-13; see also Tr. Vol. 4 at 85-87 (Engelking); Ex. 100, CN Application at 10-4.

<sup>250</sup> Ex. 100, CN Application at 10-4.

<sup>251</sup> Ex. 138, Rheinberger Rebuttal (08-510) at 10, Table 1, (JPR-4), Sch. 1-2.

<sup>252</sup> Ex. 141.

<sup>253</sup> Ex. 300, pgs. 3-4 (Hand Direct); Tr. Trans., v.2, pgs. 175-77; Exhibit 141.



whole.<sup>254</sup> An effective ERP serves to minimize the socioeconomic and environmental impact that any incident may have on the immediate area. Without an effective ERP, there is the potential for an adverse impact.<sup>255</sup>

210. The City noted that the property tax revenues to the City from Xcel Energy arising from the PINGP have decreased from approximately \$23.4 million dollars in 1996 to \$10.5 million dollars currently.<sup>256</sup> This trend is expected to continue based on a Minnesota Department of Revenue determination on the valuation of utility property and the potential for the dry casks to be exempt from taxation through a noncarbon-emitting pollution control exemption.<sup>257</sup> The City also noted that it is receiving significantly less in Local Government Aid (LGA).<sup>258</sup>

211. The City has projected budget scenarios to account for these reduced revenues. These scenarios suggest that there would be a loss of personnel to the police, fire, and ambulance services.<sup>259</sup> The City maintains that such losses of personnel would have a direct impact on the ERP readiness of City.<sup>260</sup> The City has taken numerous steps to address the ongoing and projected loss of revenue. These steps and planned actions include not filling empty positions, limiting overtime, and suspending certain expenditures and acquisitions. The City expects to reduce positions in public safety services including the police, fire and ambulance services and eliminate some equipment from those services.

212. The City has requested that the Commission require Xcel to make dedicated payments to the City as a condition of granting the CONs and Site Permit. Otherwise, the City contends that the socioeconomic and environmental impact of granting the CONs will be detrimental in that the City will no longer be able to support the ERP at its current level.<sup>261</sup> Without an effective ERP, the City contends that any incident at the PINGP may result in an adverse socioeconomic and environmental impact.

213. Existing NRC regulations require Xcel Energy to maintain an effective ERP. There is no evidence in this record to conclude that Xcel will not comply with (or that the NRC will not enforce) the regulations regarding emergency response planning.<sup>262</sup> If the City cannot provide the services necessary to support the emergency response plan for the Prairie Island Plant and ISFSI, Xcel has committed to find a replacement provider for emergency response.<sup>263</sup>

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<sup>254</sup> Ex. 300, pgs. 3-4; FEIS, Chapter 2, pgs. 22, 29, 33-35.

<sup>255</sup> *Id.*

<sup>256</sup> Ex. 303, p. 7 (Hallock Direct).

<sup>257</sup> Ex. 304, pgs. 9-10, 15-16 (Hallock Surrebuttal). Tr. Vol. 4, p. 239 (Rheinberger).

<sup>258</sup> Ex. 303, p.9 (Hallock Direct).

<sup>259</sup> Tr. V.5, pgs. 132-40 (Hallock).

<sup>260</sup> *Id.*; Exhibit 303, p. 12 (Hallock Direct).

<sup>261</sup> Ex. 300, (Hand Direct); Ex. 303, (Hallock Direct); Ex. 305, pgs. 3-4 (Hallock Surrebuttal).

<sup>262</sup> Ex. 127, Bomberger Rebuttal (08-509) at 6; Tr. Vol. 6 at 46-47 (Rakow).

<sup>263</sup> Tr. Vol. 1 at 206-07 (Bomberger).

214. The OES noted that the emergency response services now provided by the City could be provided by other communities, the Prairie Island Indian Community, or by Xcel.<sup>264</sup>

215. The City maintains that, absent a dedicated payment, the costs of providing emergency response services to the Prairie Island Plant and ISFSI will be borne by local taxpayers. The evidence in the record shows that if the proposed projects are implemented, the City will not incur any additional costs to maintain its current response preparedness.<sup>265</sup> Xcel noted that the City is fully reimbursed under the Minnesota Emergency Management Act for any costs incurred for special radiological equipment and training required to respond to a radiological incident.<sup>266</sup> Xcel Energy maintains that its contribution of more than \$4 million in property taxes to the City in 2009, and the significant increase in tax contributions if the proposed projects are approved, amounts to sufficient compensation for the burden that is anticipated to be borne by the City.<sup>267</sup>

216. The revenue to the City derived through the taxation of Xcel's capital equipment and land valuation is separate from the need for Xcel to have an adequate ERP as a condition of operating the PINGP. In the event that the burden on the City is too great, Xcel may have to provide its own emergency services. The record does not include Xcel's plans for emergency responses if the City of Red Wing will not provide such services. It is reasonable to require Xcel to report to the Commission the status of any such plans. There has been no showing in this proceeding that imposing a dedicated payment to the City to pay for emergency services is needed to ameliorate any social, economic, or environmental impact.

#### **4. Socially Beneficial Uses, Including Uses to Protect or Enhance Environmental Quality.**

217. The proposed extended power uprate will help to ensure continued reliability of the state electricity system by supplying dependable, low-cost, carbon-free, base load power that could only be reliably replaced by more expensive sources. In addition, it will increase the ability of Xcel Energy to satisfy the demands of its Minnesota customers as the state works to add wind resources and remove carbon-emitting generation units from the system.<sup>268</sup> OES witness Hwikwon Ham notes that the extended power uprate will have a positive impact in meeting the state's energy need.<sup>269</sup>

218. The production of electricity by the extended power uprate results in no emissions of greenhouse gases or other air pollutants associated with fossil-fuel

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<sup>264</sup> Tr. Vol. 6 at 58 (Rakow).

<sup>265</sup> Tr. Vol. 2 at 156-57 (Bomberger) (NRC is not imposing any additional requirements); Tr. Vol. 5 at 108 (Hallock) (Xcel Energy is not requesting any additional services).

<sup>266</sup> Tr. Vol. 5 at 38-40, 43 (Hand).

<sup>267</sup> Ex. 137, Rheinberger Rebuttal (08-509) at 10, Table 1, (JPR-4), Sch. 1-2.

<sup>268</sup> Ex. 100, CN Application at 10-1 to 10-2.

<sup>269</sup> Ex. 504, Ham Direct (08-509) at 6.

generation, such as SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, lead, or mercury that would occur if it were necessary to replace the Prairie Island Plant's production.<sup>270</sup> The power uprate also provides a hedge against exposure to increases in fossil fuel prices and future environmental regulations. The project provides these benefits without increasing the Prairie Island Plant's footprint or developing a new greenfield site, while making use of existing electric transmission infrastructure.<sup>271</sup>

219. As a provider of base load energy, the extended power uprate will help keep energy costs low in the region, helping it attract businesses and maintain steady economic growth.<sup>272</sup> Xcel Energy witness Elizabeth Engelking testified that there are large economic benefits to maintaining economic energy costs in the State of Minnesota.<sup>273</sup> The power uprate also provides significant local, state, and federal tax benefits. For example, there will be a significant increase in the local property tax payments due to the increase in investment that will occur at the Prairie Island Plant. In particular, over the period from 2010 to 2017, Xcel projected that the extended power uprate will result in an additional \$3,402,000 in property taxes paid to Goodhue County, an additional \$4,359,000 in property taxes paid to the City, and an additional \$1,894,000 in property taxes paid to School District 256.<sup>274</sup> In total, Xcel Energy estimates that property tax payments to all taxing entities will increase by \$10,402,000 over the years 2010 to 2017 as a result of the power uprate.<sup>275</sup>

220. Xcel's investigation into the environmental impacts of the proposed extended power uprate identified four primary impacts: (a) significant carbon reductions versus the alternatives considered; (b) an increase in water use by up to 10 percent; (c) a slight increase in circulating water outflow temperature; and (d) a slight increase in radioactive releases. The power uprate will not have any significant negative environmental impacts, and the Prairie Island Plant will continue to operate within the bounds of all of its environmental permits following the extended power uprate.<sup>276</sup>

221. Minnesota's Next Generation Energy Act of 2007 sets a goal of reducing statewide carbon dioxide emissions by 30 percent by 2025. Approval of the extended power uprate will result in a reduction of carbon dioxide emissions by replacing fossil fuel generation with reliable, zero-carbon power.<sup>277</sup> Absent the extended power uprate, Xcel would likely obtain needed capacity and energy from new fossil fuel resources, resulting in additional carbon emissions.<sup>278</sup> The ability to address resource needs with carbon-free energy will make it easier for Xcel to achieve the target carbon reductions in the Next Generation Energy Act.<sup>279</sup>

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<sup>270</sup> Ex. 131, Engelking Direct (08-509) at 8, 11; Tr. Vol. 4 at 82 (Engelking).

<sup>271</sup> Ex. 131, Engelking Direct (08-509) at 13.

<sup>272</sup> Ex. 100, CN Application at 10-4.

<sup>273</sup> Tr. Vol. 4 at 85-86 (Engelking).

<sup>274</sup> Ex. 137, Rheinberger Rebuttal (08-509) at (JPR-4), Sch. 1-2.

<sup>275</sup> Ex. 137, Rheinberger Rebuttal (08-509) at 10, Table 1, (JPR-4), Sch. 1-2.

<sup>276</sup> Ex. 136, Carlson Direct at 13-14, 17.

<sup>277</sup> Ex. 100, CN Application at 9-3, 10-3, 11-5; Ex. 131, Engelking Direct (08-509) at 7.

<sup>278</sup> Ex. 131, Engelking Direct (08-509) at 7; Ex. 510, Rakow Direct (08-509) at 20.

<sup>279</sup> Ex. 131, Engelking Direct (08-509) at 7-8.

222. Groundwater use at the Prairie Island Plant is governed by a water appropriation permit issued by the Minnesota Department of Natural Resources (“MDNR”). Assuming a 10 percent increase in groundwater use, the projected maximum use would be approximately 68 million gallons per year. The maximum 68 million gallons is still significantly less than the 355 million gallons per year permit limit. Xcel has demonstrated that the extended power uprate project will not affect compliance with the permit limits.<sup>280</sup>

223. Operating the Prairie Island Plant with the uprate will require increased use of the evaporative cooling towers. This will slightly increase the amount of water used at the Prairie Island Plant. The extended power uprate is expected to increase surface water appropriations through evaporation by approximately 1,300 acre ft/year or 10 percent. This increase is within the limits of the current surface water appropriation permit issued by the MDNR.<sup>281</sup> With the increased use through the uprate, water consumption will remain approximately 1 percent of the lowest annual mean Mississippi River flow. Impacts caused by the higher evaporative losses from the Mississippi River are very small and will likely have an insignificant impact on the Mississippi River flow.<sup>282</sup>

224. Operating the Prairie Island Plant with the uprate will result in an increased temperature of the discharged water from the cooling process. The increased thermal discharge at the Prairie Island Plant will remain within the limits of the current NPDES/SDS permit and will not harm aquatic organisms. Xcel’s NPDES/SDS permit issued by the MPCA regulates the Prairie Island Plant’s wastewater discharges, including thermal discharges to the Mississippi River. The NPDES/SDS permit is a complex document that authorizes discharges and intakes and imposes limits and/or monitoring/reporting requirements for discharges from the Prairie Island Plant.<sup>283</sup> The NPDES/SDS permit includes thermal limits that are linked to the temperatures in the Mississippi River upstream and downstream of the Prairie Island Plant, and the current permit limits act to minimize the size of the thermal plume from the plant’s discharge.<sup>284</sup> The thermal discharge will remain within these protective limits following the extended power uprate.<sup>285</sup>

225. The extended power uprate will slightly increase the temperature of the circulating water discharged to the Mississippi River. Under a worst-case scenario analysis, the power uprate would increase the temperature at Lock and Dam No. 3, the compliance point under Xcel Energy’s NPDES/SDS permit, by 0.2°F.<sup>286</sup> The maximum temperature increase would be 3°F at the discharge canal inlet, which is more than one-half mile inland from the Prairie Island Plant’s discharge into the Mississippi River. The maximum 3°F increase at the discharge canal inlet therefore would generally be

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<sup>280</sup> Ex. 64, FEIS, Ch. 1 at 74; Ex. 136, Carlson Direct at 15.

<sup>281</sup> Ex. 64, FEIS, Ch. 1 at 69; Ex. 136, Carlson Direct at 15.

<sup>282</sup> Ex. 64, FEIS, Ch. 1 at 68-69, 93.

<sup>283</sup> Ex. 175, NPDES/SDS Permit; Tr. Vol. 6 at 133 (Flowers); Ex. 100, CN Application at 8-5.

<sup>284</sup> Ex. 64, FEIS, Ch. 1 at 48, 69-70.

<sup>285</sup> Ex. 64, FEIS, Ch. 1 at 69-70, 93; Ex. 136, Carlson Direct at 15-16.

<sup>286</sup> Tr. Vol. 3 at 128 (Carlson); Tr. Vol. 6 at 120-21, 124 (Flowers).

confined to the plant's circulating water system and in the discharge canal.<sup>287</sup> The maximum temperature increase would occur when the circulating cooling-water system is operated in open-cycle mode, which is used primarily in the winter when cooling tower operation is not needed to meet NPDES/SDS permit requirements. In contrast, the temperature increase is lowest in the summer and during periods of low river flow, when NPDES/SDS permit limits require cooling tower use.<sup>288</sup> Discharge temperatures will be maintained within the current NPDES/SDS permit limits by increasing the use of cooling towers, which can operate in various modes or, if necessary, by derating (reducing the rated power output) of the Prairie Island Plant to meet permit requirements for water appropriations and thermal discharge.<sup>289</sup>

226. The Community expressed serious concerns about the environmental impacts on the thickness of the Lake Pepin ice cover, as well as socioeconomic impacts that flow from these environmental impacts.<sup>290</sup> The PINGP Study Group submitted information regarding the MN DNR expression of concern over this issue, in which the agency stated:

A principal concern for the Department of Natural Resources is the effect of the new thermal discharge regime on the ice cover conditions of Lake Pepin, and the fact that ice conditions are not regulated by or result from violations of the state water quality standards for temperature. The previously referenced thermal performance model did not include the December through March period. This is a period of open-cycle operation with no cooling towers in use and, with the uprate, an additional 3 degrees Fahrenheit being discharged to the river. . . The data referenced by Xcel also does not represent the conditions associated with the thermal discharge of the extended power uprate.

The ice conditions on the upper 6 miles of Lake Pepin have been impaired since 1983 when modifications of the NPDES permit allowed discontinuation of cooling tower use during the winter. Popular fishing destinations downstream of this upper extent of lake, such as major points and bars, have also become hazardous locations. Lake Pepin ice conditions will be further degraded with the uprate unless a more balanced facility design is implemented. This will require partial winter cooling tower use to address the newly proposed increment of heat, and also to address a reasonable fraction of the additional thermal loading that has been characteristic of the discharge since 1983. This change in current operating procedures would need to be based on river and lake studies of temperature and ice conditions.<sup>291</sup>

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<sup>287</sup> Tr. Vol. 3 at 128 (Carlson); Tr. Vol. 6 at 128 (Flowers).

<sup>288</sup> Ex. 64, FEIS, Ch. 1 at 70; Tr. Vol. 3 at 162-63 (Carlson).

<sup>289</sup> Ex. 64, FEIS, Ch. 1 at 69.

<sup>290</sup> Community Brief at 26-27.

<sup>291</sup> PINGP Study Group Comment, Attachment C, p. 2 (MDNR Letter, Aug. 21, 2009).

227. Xcel noted that, after the extended power uprate, the increased thermal discharge at the Prairie Island Plant will remain within the limits of the current NPDES/SDS permit. Under the worst-case scenario addressed in the FEIS, the extended power uprate would increase the temperature at Lock and Dam No. 3, the compliance point under Xcel Energy's NPDES/SDS permit, by 0.2°F.<sup>292</sup> This slight increase in temperature is not expected to impact ice thickness on Lake Pepin, approximately 11.5 miles further downstream.<sup>293</sup>

228. There has been no showing that the extended power uprate will have a significant impact on the environment.<sup>294</sup> In particular, the extended power uprate will not affect mollusk species, including the Higgins eye pearly mussel, or other aquatic organisms, and will not affect bird species using the Mississippi flyway as a migration route.<sup>295</sup> Xcel Energy's NPDES/SDS permit expires in 2010 and will be reissued prior to implementation of the extended power uprate at Prairie Island Unit 1 in 2012.<sup>296</sup>

229. When Xcel renews its permit, Xcel Energy must complete a pre-modification thermal assessment and a post-modification thermal assessment, two years before and after the implementation of the extended power uprate.<sup>297</sup> The results of the thermal assessment are used by the MPCA to evaluate whether any changes to the permit are necessary.<sup>298</sup>

230. Xcel has not shown how the MPCA will be making its decision regarding the impact of thermal discharge on the environment, particularly regarding the formation of ice on Lake Pepin. The parties to this proceeding have shown that there has been a noticeable change in the formation of ice and that this has coincided with a change in operations at the Prairie Island Plant affecting thermal discharge. Under these circumstances, requiring a study of the ice formation on Lake Pepin that can be correlated with operations at the Prairie Island Plant is a reasonable approach to assessing the impacts that may result from continued operations and uprated operations. This condition is within the jurisdiction of the Commission and is likely to aid the MPCA when the Prairie Island Plant's NPDES permit is renewed.

231. The possibility of radiation exposure is a major public health concern associated with nuclear plant operations and spent fuel storage. These activities are subject to extensive monitoring and regulation. The specific issues relating to radiation exposure from the Prairie Island Plant were thoroughly addressed in the FEIS.

232. Current radionuclide releases from the Prairie Island Plant result in radiological doses well within federal regulations and are indistinguishable from background radiation. Xcel assumed, based on the changes planned to achieve the

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<sup>292</sup> Ex. 64, FEIS, Ch. 1. at 70; Tr. Vol. 6 at 120-24 (Flowers); Tr. Vol. 3 at 128 (Carlson).

<sup>293</sup> Ex. 64, FEIS, Ch. 1 at 72; Tr. Vol. 6 at 219 (Flowers).

<sup>294</sup> Ex. 64, FEIS, Ch. 1 at 70.

<sup>295</sup> Ex. 64, FEIS, Ch. 1 at 50-51.

<sup>296</sup> Tr. Vol. 6 at 106-07 (Flowers).

<sup>297</sup> Tr. Vol. 6 at 111-12 (Flowers); Ex. 177, NPDES Permit Timeline.

<sup>298</sup> Tr. Vol. 6 at 113 (Flowers).

power uprate, that the radiological releases will increase by approximately 10 percent following the extended power uprate. At this higher level, radiological doses will remain within federal regulations and will continue to be indistinguishable from background radiation.<sup>299</sup> In particular, the off-site dose from gaseous effluents is estimated to increase from 0.0026 mrem/yr to 0.0028 mrem/yr. This amount is indistinguishable from background radiation. The off-site dose from liquid effluents is similarly estimated to increase from 0.0026 mrem/yr to 0.0028 mrem/yr, also indistinguishable from background radiation.<sup>300</sup>

233. These doses are significantly less than the NRC regulations, which set the dose limits that are compatible with public safety at 30 mrem/yr for total body gaseous radiological effluents and 6 mrem/yr for total body liquid effluents.<sup>301</sup> Following the extended power uprate, onsite and off-site radiation doses will remain well below federal regulatory limits,<sup>302</sup> and impacts to humans and the environment from near background radiation are not anticipated to be significant.<sup>303</sup>

234. The Community expressed its concern regarding the potential for environmental and human health impacts of long-term radiation exposure and increased cancer and genetic risks of populations that reside near nuclear plant operations.<sup>304</sup> The Community maintained that there is a well established and uniformly accepted principle that exposure to low doses of radiation – even doses well below the exposure limit set by the NRC – can cause damage at the genetic and molecular level.<sup>305</sup> As a result, Dr. Wilkinson has proposed that studies “should be carried out for residents of Prairie Island and surrounding communities, using the latest and best available technology, including genetic epidemiology and genomic profiling differential diagnosis.”<sup>306</sup>

235. Xcel notes that following the extended power uprate, operation of the Prairie Island Plant will result in radiation emissions that are significantly below the NRC limits. The NRC allows 30 mrem/yr for total body gaseous and radiological effluents and 6 mrem/yr for total body liquid effluents. Following implementation of the extended power uprate, the total body doses to off-site members of the general public will increase from 0.0026 to 0.0028 mrem/yr for gaseous and liquid radiological effluents.<sup>307</sup>

236. Xcel Energy’s witness in this area, Dr. Hoel, testified that the NRC limits are consistent with the large body of research on the health risks of low dose radiation,

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<sup>299</sup> Ex. 64, FEIS, Ch. 1 at 82.

<sup>300</sup> Ex. 64, FEIS, Ch. 1 at 83-84, Table 4-7, Table 4-8; Tr. Vol. 6 at 264-65 (Pickens).

<sup>301</sup> Ex. 100, CN Application at 8-21 to 8-22, Table 8-7.

<sup>302</sup> Ex. 64, FEIS, Ch. 1 at 93.

<sup>303</sup> Ex. 64, FEIS, Ch. 1 at 82.

<sup>304</sup> Dr. Wilkinson Direct Testimony, Ex. 400; Dr. Wilkinson Surrebuttal, Exh. 406; Final EIS at pp. 87-88 and n. 69-70, 74.

<sup>305</sup> Ex. 406, at p. 6, and Attachment GSW-6.

<sup>306</sup> Ex. 406, at 2 Wilkinson Surrebuttal.

<sup>307</sup> Ex. 64, FEIS, Ch. 1 at Table 4- 7, Table 4-8; Tr. Vol. 6 at 264-65 (Pickens).

including the limits proposed by the National Academy of Sciences in the BEIR VII report.<sup>308</sup>

237. The MDH conducted a study of cancer rates in Goodhue County to address public concerns, particularly in relation to the Prairie Island Plant. The study concluded that cancer incidence and mortality rates in Goodhue County were at or below statewide averages and that the rate of childhood cancers is also at or below the average. The study supports the conclusion of the MDH, and the FEIS, that there is no significant additional cancer risk associated with living near the Prairie Island Plant.<sup>309</sup>

238. Dr. Hoel indicated that the MDH's study of cancer rates in Goodhue County is consistent with the large body of research on the incidence of childhood cancers near nuclear facilities that demonstrates that the radiation doses emitted from the normal operation of a nuclear facility do not cause an increased incidence of cancers among children who reside near nuclear facilities.<sup>310</sup> Dr. Hoel noted that there have been several studies that have found clusters of increased childhood cancer rates near nuclear facilities. None of those clusters have been found to be attributable to the low-dose radiation emitted from the normal operation of a nuclear facility.<sup>311</sup>

239. Dr. Hoel and the MDH found that a cancer study on the population of residents living within 3 miles of the Prairie Island Plant, or of the Community alone, is unlikely to produce any useful information on the health impacts of the low-dose radiation emitted from the Prairie Island Plant. First, the sample size (a few hundred people of all ages) is insufficient to conduct a valid study.<sup>312</sup> Second, the radiation levels emitted from the Prairie Island Plant, both currently and following the extended power uprate, are significantly lower than natural background radiation and therefore cannot be distinguished from naturally occurring background radiation.<sup>313</sup>

240. The FEIS estimated that the average American receives approximately 300 mrem/yr of background radiation from natural sources.<sup>314</sup> Following the extended power uprate, the total body dose to offsite members of the general public will only be 0.0028 mrem/yr for gaseous and liquid radiological effluents.<sup>315</sup> The significantly lower level of exposure renders improbable the suggestion that a study would be able to attribute causation of any health effect to the operation of the Prairie Island Plant.

241. Regarding the specific testing urged by the Community, a genetic monitoring program would be unable to identify any potential health impacts arising from low-dose radiation with any certainty. The use of gene expression to establish an environmental health and safety baseline has not yet been established.<sup>316</sup> Dr. Hoel

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<sup>308</sup> Ex. 139, Hoel Rebuttal at 10.

<sup>309</sup> Ex. 139, Hoel Rebuttal at (DGH-2) (Page vii); Ex. 64, FEIS, Ch. 1 at 90-91.

<sup>310</sup> Ex. 178, Hoel Surrebuttal at 3.

<sup>311</sup> Ex. 178, Hoel Surrebuttal at 5.

<sup>312</sup> Ex. 139, Hoel Rebuttal at 8-9; Hoel Rebuttal at (DGH-2) (Page 3).

<sup>313</sup> Exhibit 139, Hoel Rebuttal at 10-11; Hoel Rebuttal at (DGH-2) (Page 3).

<sup>314</sup> Ex. 64, FEIS, Ch. 1 at 76.

<sup>315</sup> Ex. 64, FEIS, Ch. 1 at Table 4-7, Table 4-8; Tr. Vol. 6 at 264-65 (Pickens).

<sup>316</sup> Ex. 178, Hoel Surrebuttal at 10-11.



demonstrated that the only common biological dosimeter has been unable to detect the low-dose radiation exposures from the normal operation of a nuclear facility.<sup>317</sup> Further, Dr. Hoel noted that no molecular method, no matter how sophisticated, will be able to determine that there has been an exposure beyond the natural background.<sup>318</sup>

242. The record in this matter shows that applicable regulatory standards are protective of human health and that both past local studies and recent research establish that low-dose radiation does not increase the risk of cancer among persons residing near nuclear facilities.<sup>319</sup>

243. Under the May 2003 Settlement Agreement between the Community and Xcel Energy, Xcel Energy provides the Community with a substantial annual payment for expenses associated with a health study.<sup>320</sup> The evidentiary record in this proceeding does not support the Community's recommendation that Xcel Energy fund a further study directed at genetic testing prior to the approval of the requested proposed power uprate, and there is no demonstration of need for the Commission to impose additional conditions in the Certificate of Need to address the Community's concern in this area.

244. The Community argues that ongoing tritium contamination of groundwater at the Prairie Island Plant demonstrates that the extended power uprate cannot be accomplished in a manner that protects the natural, socioeconomic, and human health environments.<sup>321</sup> The evidence suggests, however, that the source of elevated tritium levels in two on-site wells at the Prairie Island Plant is due to historic releases at the plant, and there is no evidence in the record that these historic releases are currently causing or threatening harm to the environment or human health.

245. Xcel performs monitoring of tritium levels detected in groundwater in and around the Prairie Island Plant, both through the Radiological Environmental Monitoring Program ("REMP") required by the NRC, as well as through a special tritium monitoring program.<sup>322</sup> The 2008 results of the special tritium monitoring program show that the tritium level annual averages have shown a downward trend since the special sampling began in 1989, and except for sampling in two on-site wells, all off-site and on-site samples were within the range of expected background tritium levels.<sup>323</sup>

246. The tritium levels detected in all monitoring wells were within the EPA's drinking water standard of 20,000 pCi/L. The highest level detected amounted to approximately 10 percent of the EPA's standard.<sup>324</sup>

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<sup>317</sup> *Id.*

<sup>318</sup> Ex. 178, Hoel Surrebuttal at 14.

<sup>319</sup> Ex. 139, Hoel Rebuttal at 10; Ex. 178, Hoel Surrebuttal at 3.

<sup>320</sup> Ex. 156, Settlement Agreement at ¶1(iv).

<sup>321</sup> Community Initial Brief at 19-23.

<sup>322</sup> Ex. 173, 2008 REMP Report for Prairie Island at 15-16, App. E.

<sup>323</sup> Ex. 173, 2008 REMP Report for Prairie Island at App. E-5.

<sup>324</sup> Ex. 173, 2008 REMP Report for Prairie Island at E-10, Table E-4.4.

247. The Community noted that significant quarterly fluctuations in tritium releases at the PINGP have been observed over the past 35 years of operation.<sup>325</sup> Xcel has not explained the fluctuations in quarterly tritium levels. The reported tritium contamination in Well P-10 in 2006 fluctuated from a reported low of 432 pCi/l in the April 2006 sample to the highest ever reported level of 3,773 pCi/l in the September 2006 sample.<sup>326</sup>

248. The Community suggested that Xcel's practice of dumping sump water from collection sumps within the Prairie Island Plant directly into a landlocked area of soil just outside of the plant has elevated tritium levels in the groundwater.<sup>327</sup> Xcel acknowledged that this procedure of dumping liquid waste into the soil of the landlocked area has been looked at "very hard and probably discontinued simply because they're not certain if this contributed or did not contribute [to increased tritium levels], but that was an area where there were minor amounts of tritium at times in some of that water, and it may have very well been discharged there."<sup>328</sup> There is no indication that Xcel has committed to permanently discontinue this practice.

249. Due to the observed tritium in groundwater, the Community proposed that the following conditions be placed on Xcel's Site Permit:

1. Implement, in full, each and every objective and criterion set forth in the Nuclear Energy Institute's Groundwater Protection Initiative.<sup>329</sup> The initiative should be implemented, in full, no later than April 30, 2010.
2. Provide detailed written reports to the Community and the City of Red Wing, as well as MDH, every three months, which will include well monitoring information in and around the plant, as well as summarize material information discovered as it implements and maintains each discrete subpart of the groundwater protection initiative.
3. Discontinue permanently the discharge of any liquid waste into the landlocked area.<sup>330</sup>
4. Conduct a comprehensive surface investigation in and around wells P-10, MW-7 and MW-8, and consider the installation of other monitoring wells in and around the area of wells MW-7 and MW-8.<sup>331</sup>

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<sup>325</sup> Community's August 21, 2009 Comments on the Final EIS, Exhibit 2 (taken from Xcel's Annual Radioactive Effluent Report and Offsite Dose Calculation, e.g., Section 19 of the 2006 Annual Radioactive Effluent Report and Offsite Dose Calculation, page 7).

<sup>326</sup> Ex. 173; Community Brief, at 22.

<sup>327</sup> Hearing Transcript, Vol. 6, at 207, 214-15, 223; Exs. 174A and 174B.

<sup>328</sup> *Id.* at 223. Xcel has temporarily discontinued dumping this liquid waste directly onto the soil. (Flowers) *Id.* at 223-24.

<sup>329</sup> Ex. 404.

<sup>330</sup> Hearing Transcript, Vol. 6, at pp. 223-224; Ex. 174A and 174B.

<sup>331</sup> Hearing Transcript, Vol. 6, at pp. 214-217.

5. Identify the source and quantity of all liquid and gaseous tritium emissions, including providing a comprehensive explanation for the fluctuating amounts of tritium released and detected in PINGP's monitoring wells dramatically month-to-month and year-to-year.<sup>332</sup>

250. Xcel began special monitoring for tritium, in addition to the groundwater monitoring that is performed as part of the REMP, in 1989.<sup>333</sup> Under the special tritium monitoring program, special well and surface water samples are collected from various wells at different frequencies depending upon the amount of tritium that has been found in the wells historically.<sup>334</sup> In 2008, Xcel took samples quarterly at one location, monthly at five locations, semi-annually at 6 locations, and annually at thirty-two locations.<sup>335</sup> The samples taken as part of the special tritium monitoring program are sent for analysis to a laboratory at the University of Waterloo in Canada. Xcel chose that laboratory because its testing protocol is able to detect tritium at much lower levels (19 pCi/L) than the typical REMP monitoring levels (140 to 170 pCi/L).<sup>336</sup>

251. Xcel Energy contends that it has implemented the standards set forth in NEI's Groundwater Protection Initiative.<sup>337</sup> Xcel Energy's implementation of the NEI Groundwater Protection Initiative is expected to be part of the NRC inspection and review of the Prairie Island Plant's groundwater program in the Fall of 2009.<sup>338</sup>

252. With the fluctuations in the observed levels of tritium and Xcel's inability to identify the source of the contaminant, increased monitoring for tritium is a reasonable approach to protect against further contamination. The reasonableness of this approach is supported by the modifications to the Prairie Island Plant that are required to implement the extended power uprate. The modifications create the opportunity for the release of contaminants. The Community's proposed conditions one through four are appropriate to put in place to address the observed presence of tritium and protect against further releases. Conditions one and three appear to have been already met by Xcel. The fifth proposed condition should not be imposed, since it holds Xcel to an unreasonable state of knowledge about tritium releases from the Prairie Island Plant.

253. The evidence in the record demonstrates that the extended power uprate will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments. The proposed extended power uprate is compatible with public health. It is appropriate to impose conditions on the Site Permit to address substantiated concerns regarding tritium releases and legitimate concerns regarding thermal discharge affecting Lake Pepin ice formation.

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<sup>332</sup> Community Brief, at 39.

<sup>333</sup> Ex. 173, 2008 Prairie Island REMP Report at App. E-2; Ex. 64, FEIS, Ch. 1 at 85.

<sup>334</sup> Tr. Vol. 6 at 143 (Flowers).

<sup>335</sup> Ex. 173, 2008 REMP Report for Prairie Island at App. E-4.

<sup>336</sup> *Id.*

<sup>337</sup> Tr. Vol. 2 at 113 (Bomberger); Tr. Vol. 6 at 142 (Flowers); see also Ex. 405, Xcel Energy Response to Community IR No. 108 (noting that Xcel Energy has implemented the NEI groundwater initiative in the Prairie Island Plant's Ground Water Protection Program).

<sup>338</sup> Tr. Vol. 6 at 142 (Flowers); Ex. 312, Prairie Island Inspection/Activity Plan at 2.

## 5. Views of the Public

### Economic Effects

254. A number of speakers at the public hearings stressed the benefits to the local community arising from the operation of the Prairie Island Plant. John Howe, Mayor of the City of Red Wing, stated that the City Council supports the Company and its applications for the Certificates of Need. Mr. Howe further stated that the City is committed to assisting the Company maintain operations and its employment base in the community. Mr. Howe also expressed reservations about the Company's applications, including: (1) that if the Prairie Island Plant is licensed for another 20 years of operation, and if the additional dry cask storage is permitted, a safe, reliable, long-term storage solution for spent nuclear fuel must be found; (2) due to the current budget crisis, public safety services face budget reductions, potentially affecting the City's emergency preparedness for responding to incidents at the Prairie Island Plant; and (3) in recent years the Company has been able to reduce its property taxes, resulting in a property tax shift onto other property classifications in the City.<sup>339</sup>

255. Carol Duff, a citizen of Red Wing and member of the Red Wing City Council, stated that the City and Xcel Energy have a long-standing working relationship, and that the City has benefited from the tax base and employment base provided by the Prairie Island Plant. Ms. Duff stated that the City has used that tax revenue to invest in emergency preparedness and that the City supports the Company's Certificate of Need applications, but has the following concerns: (1) long-term storage of spent nuclear fuel; (2) assurances to protect the City in case of an incident due to the extended power uprate; and (3) the City has diminishing resources, resulting from cuts to local government aid, to address its obligations as the host city of the Prairie Island Plant to provide adequate emergency resources in the event of an incident.<sup>340</sup>

256. Andrija Vukmir, a citizen of Red Wing, urged the NRC and the public to support the extended power uprate and additional dry cask storage at the Prairie Island Plant. Mr. Vukmir stated that nuclear plants are the lowest cost producers of baseload energy for safe and reliable electricity, that nuclear plants keep American businesses competitive and are sources of local job growth, that nuclear plants do not emit carbon dioxide and account for a majority of reductions in greenhouse gas emissions, and that nuclear plants are among the safest and most secure industrial facilities in the United States.<sup>341</sup>

257. Daniel Mjolsness, a citizen of Red Wing and former Superintendent of Schools in Red Wing, stated that the City and Goodhue County governments, as well as the Red Wing school district, have benefited from the tax revenue from the Prairie Island Plant. Mr. Mjolsness stated that in past years, Xcel Energy generated over 60 percent of the operating revenue of the Red Wing school district, but legislative action has reduced that amount to 16.5% in 2009. Mr. Mjolsness stated his hope that the

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<sup>339</sup> Public Hearing (Evening) Tr. at 52-62.

<sup>340</sup> Public Hearing (Afternoon) Tr. at 56-63.

<sup>341</sup> Public Hearing (Afternoon) Tr. at 72-75; Ex. 36, Vukmir Statement.

continued operation and expansion of the Prairie Island Plant will return the community tax base to a higher level. Mr. Mjolsness stated his belief that the Company's application for continued operation and any future expansion of the Prairie Island Plant should be approved.<sup>342</sup>

258. George Grotkin, a citizen of Red Wing, asked the Administrative Law Judge to accept the Company's applications. Mr. Grotkin stated that the City's tax base has been enhanced by the taxes generated by the Company and by the wages of citizens of the City employed by the Company. Mr. Grotkin suggested that spent nuclear fuel at the Prairie Island Plant be recycled to generate more energy instead of placed into dry cask storage.<sup>343</sup>

259. Dean Massett, a citizen of Red Wing, stated that since 1973, the Company and hundreds of its employees have contributed to the financial well-being of the community. Mr. Massett stated the jobs provided by the Prairie Island Plant support the economic stability of the area, and that many local businesses benefit from the variety of goods and services the Prairie Island Plant requires in its daily operation. Mr. Massett stated that while the storage of spent nuclear fuel remains a concern for everyone, the Company has demonstrated its ability to safely store spent fuel at the Prairie Island Plant for nearly 15 years. Mr. Massett stated that approval of the Company's application for a Certificate of Need for a power uprate and spent fuel storage will ensure that the Prairie Island Plant continues to provide a sound energy future and continues to support the City and the surrounding area.<sup>344</sup>

260. Jerry Borgen, a citizen of Red Wing, stated that in 1994 the City sent a delegation of 1,300 citizens to St. Paul in support of the 1994 legislation to allow dry cask storage of spent nuclear fuel at the Prairie Island Plant. Mr. Borgen stated that passing that legislation meant the City would keep over 600 well-paid jobs and the Prairie Island Plant would generate electricity for thousands of homes and factories. Mr. Borgen stated that the Company is a good corporate citizen. Mr. Borgen urged the Commission and the City to seek ways to augment the loss of taxes over the past several years. Mr. Borgen stated the Prairie Island Plant has an excellent record for safety and reliability.<sup>345</sup>

261. Amber Tezel, a citizen of Red Wing, submitted written comments to the Administrative Law Judge via e-mail following the public hearings. Ms. Tezel voiced her support for the additional dry cask storage and continued operation of the Prairie Island Plant. In particular, Ms. Tezel noted the benefits of nuclear power and the positive impacts the Prairie Island Plant has on the community by providing jobs and tax revenues.<sup>346</sup>

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<sup>342</sup> Public Hearing (Afternoon) Tr. at 75-80; Ex. 37, Mjolsness Statement.

<sup>343</sup> Public Hearing (Afternoon) Tr. at 80-83; Ex. 38, Grotkin Statement.

<sup>344</sup> Public Hearing (Afternoon) Tr. at 87-91; Ex. 39, Massett Statement.

<sup>345</sup> Public Hearing (Afternoon) Tr. at 92-96; Ex. 40, Borgen Statement.

<sup>346</sup> Tezel Comments (May 15, 2009).

262. George Crocker, of the North American Water Office, stated that there is a fundamental change taking place in terms of the infrastructure and machinery used to generate electricity. Mr. Crocker stated that while about 20 power plants currently serve the load in Minnesota, by 2015 the same load will be served by 200,000 generators. Mr. Crocker stated that relicensing the Prairie Island Plant will prevent the development of cost-effective technologies that pose less risk to health and safety.<sup>347</sup>

### **Timeframe for Storage of Spent Fuel**

263. The public expressed concern that spent nuclear fuel may remain on-site at the Prairie Island ISFSI indefinitely and questioned whether there is a plan in place for long-term storage of spent nuclear fuel, particularly given the delay in the development of the DOE Yucca Mountain Repository and the legislative limits on the amount of spent fuel to be accepted there. In particular, the public raised concerns about using temporary facilities, such as the Prairie Island ISFSI, for long-term storage and noted that the Yucca Mountain no-action alternative recommended facility replacement every 100 years.

264. Joan Marshman, a citizen of Frontenac, stated that the DEIS is flawed and incomplete because it: (1) assumes there will be a federal repository and fails to provide any assurances that the on-site dry cask storage will not become a permanent facility; and (2) does not consider the cumulative effects of at-reactor storage or the potential for cask failure over time.<sup>348</sup>

265. Kristen Eide-Tollefson, of Communities United for Responsible Energy (“CURE”), stated that ISFSIs are designed and licensed for a temporary storage period of between 20 and 40 years. Ms. Eide-Tollefson expressed concern that while some engineering studies project out to 100 years for safe storage, the EIS is looking at storage for 200 years and beyond. Ms. Eide-Tollefson further expressed concern about the impact precipitation and freeze-thaw cycles in Minnesota would have on the casks.<sup>349</sup> Ms. Eide-Tollefson submitted additional comments on behalf of CURE via e-mail to the Administrative Law Judge following the public hearings. Ms. Eide-Tollefson stated that the alternatives development for the dry cask storage record is inappropriately constrained by the NRC’s “single source” alternatives rule. Ms. Eide-Tollefson requested that the Administrative Law Judge order updating the record on wind-gas and gas alternatives. Ms. Eide-Tollefson included with her additional comments certain materials relating to the Company’s 2000 Resource Plan.<sup>350</sup>

### **Thermal Discharge**

266. The public also expressed concerns regarding the Prairie Island Plant’s thermal plume into the Mississippi River and other issues related to water discharges at the plant. Andru Peters, a citizen of Lake City, stated his concern regarding discharge of

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<sup>347</sup> Public Hearing (Evening) Tr. at 67-87.

<sup>348</sup> Public Hearing (Evening) Tr. at 41-48; Ex. 42, Marshman Statement.

<sup>349</sup> Public Hearing (Afternoon) Tr. at 104-17; Ex. 49, Eide-Tollefson Statement.

<sup>350</sup> Eide-Tollefson Comments (May 26, 2009).

warmer water into Lake Pepin. Mr. Peters stated that Lake City and surrounding communities depend on winter recreation activities on Lake Pepin, and that the discharge of warmer water might result in having open water on Lake Pepin year-round.<sup>351</sup>

267. Ms. Eide-Tollefson, submitting comments on behalf of Katie Himanga, a citizen of Lake City, stated that the thermal discharge from the Prairie Island Plant has the potential to impact vertebrate and invertebrate organisms, parasites, ice cover, and the distribution of sediment in the Mississippi River bed and in Lake Pepin, warranting the establishment of a baseline of aquatic and plant health and the development and implementation of a monitoring system to detect adverse impacts. Ms. Eide-Tollefson also stated that thermal discharge from the Prairie Island Plant results in areas of variable and unpredictable ice cover on Lake Pepin, and that this results in reduced accessibility to certain areas of the lake and increased concern for safety.<sup>352</sup>

268. Alan Muller, a citizen of Red Wing, submitted written comments to the Administrative Law Judge following the public hearings. Mr. Muller stated his opinion that the Prairie Island Plant is not operating in compliance with the Clean Water Act, due to impingement (trapping fish in screens), entrainment (pulling in eggs, fish larvae), and thermal impacts. Mr. Muller also stated that the DEIS failed to meet statutory requirements, that the deadline for public comments on the DEIS should be extended by several months, and that additional public hearings should be held.<sup>353</sup>

### **Safety Concerns**

269. The public also expressed concerns about aging infrastructure at the plant, declining human performance, and the risks to the public, particularly members of the Community, from operation of the Prairie Island Plant. Ron Johnson, a member of the Community, stated that the Community does not benefit from the Prairie Island Plant as much as the City. Mr. Johnson noted that a large part of the Community reservation lies within 600 yards to a mile of the vicinity of the Prairie Island Plant. Mr. Johnson further stated that the Prairie Island Plant is aging, that the Prairie Island Plant has experienced a decline in human performance, and that adequate training or knowledge of operating the Prairie Island Plant is a grave concern to the Community.<sup>354</sup>

270. Byron White, a member of the Community, stated that during a recent annual assessment of the Prairie Island Plant's safety performance, the NRC said the plant experienced a decline in human performance. Mr. White stated that he is concerned about increasing the risk of operating the Prairie Island Plant and about "[tritium] leaks from the plant ... detected in the groundwater."<sup>355</sup>

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<sup>351</sup> Public Hearing (Afternoon) Tr. at 63-71.

<sup>352</sup> Public Hearing (Evening) Tr. at 134-43; Ex. 50, Himanga Statement.

<sup>353</sup> Muller Comments (May 25, 2009).

<sup>354</sup> Public Hearing (Afternoon) Tr. at 96-100.

<sup>355</sup> Public Hearing (Evening) Tr. At 87-94.

271. Becky Creglow, a local citizen, asked why she is not able to get insurance that covers incidents at the Prairie Island Plant. She stated that she had tried calling different insurance companies. Terry Pickens, on behalf of Xcel, stated that Xcel is required by its license to carry insurance policies.<sup>356</sup> Ms. Creglow and her husband Mike Creglow submitted additional comments via e-mail to the Administrative Law Judge following the public hearings. They stated that they are against extending the license of the Prairie Island Plant and that they are opposed to Xcel storing more nuclear waste on-site. They voiced concerns regarding safety at nuclear plants.<sup>357</sup>

272. Mike Childs, Jr., a member of the Community and former Xcel employee at the Prairie Island Plant, expressed concern for the Prairie Island Plant's control system for reactor protection and control. Mr. Childs stated that during his employment at the Prairie Island Plant, there had been a reactor coolant leak. Mr. Childs also stated he had learned that during construction of the Prairie Island Plant, burial grounds of the Community had been desecrated and that the DEIS did not adequately consider impacts to the Community.<sup>358</sup> Mr. Childs submitted additional comments and information to the Administrative Law Judge following the public hearings. Mr. Childs provided additional comments on the DEIS and information regarding the Company's license renewal application and irradiation embrittlement in the steel used in reactor pressure vessels.<sup>359</sup>

273. Phillip Mahowald, General Counsel for the Community, submitted comments on behalf of the Community Legal Department to the Administrative Law Judge following the public hearings. Mr. Mahowald stated that the Company had yet to address three safety-related contentions identified by the Community. Mr. Mahowald stated that tritium and other radiological contaminants pose a continuing threat to the Community. Mr. Mahowald also stated that many of the conclusions in the DEIS are the same conclusions made by the Company in its Certificate of Need Application, and that alternatives to the extended power uprate had not been fully evaluated. Mr. Mahowald also expressed disappointment that the Community's comments on the DEIS had not been provided to the Administrative Law Judge, and he included a copy of the Community's comments to the DEIS in his submission.<sup>360</sup>

274. Gita Ghei, a citizen of St. Paul, submitted comments via e-mail to the Administrative Law Judge following the public hearings. Ms. Ghei stated that 600 jobs and tax revenue should not outweigh safety concerns.<sup>361</sup>

### **Security Concerns**

275. Members of the public also expressed security concerns associated with the Prairie Island Plant. Ted Tollefson, a citizen of Frontenac, stated his concern that

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<sup>356</sup> Public Hearing (Afternoon) Tr. at 101-104.

<sup>357</sup> Creglow Comments (May 25, 2009).

<sup>358</sup> Public Hearing (Evening) Tr. at 108-31; Ex. 43-48, Information Presented by Mr. Childs.

<sup>359</sup> Childs Comments (Undated).

<sup>360</sup> Community Legal Department Comments (May 26, 2009).

<sup>361</sup> Ghei Comments (May 22, 2009).



terrorists might attempt an attack upon the Prairie Island Plant. Mr. Tollefson also stated his concern that the spent nuclear fuel will be around much longer than the people making decisions about its storage. Mr. Tollefson suggested that there are other ways to generate power that have smaller risks, including creating a smart grid.<sup>362</sup>

276. Mr. Crocker submitted comments via e-mail to the Administrative Law Judge following the public hearings. He stated three security concerns: (1) that a plausible worst-case scenario for the Prairie Island Plant would involve anti-tank ground warfare systems; (2) that spilling irradiated fuel in a pile on the pad has the potential to initiate a nuclear reaction and scatter radioactive debris; and (3) that the spent fuel storage pool, rather than the casks, might be the primary target of an attack, resulting in a radioactive release several hundreds times worse than the Hiroshima bomb.<sup>363</sup>

### **Other Concerns**

277. Charlotte Eastin, a citizen of Lake City, stated that she has been saying “no” to nuclear power for more than thirty years. Ms. Eastin stated that she can make a reasonable projection that “something stupendously bad” will happen at some time at the Prairie Island Plant. Ms. Eastin offered a proposal to create a time capsule that will be opened at every interval that the casks at the Prairie Island Plant are replaced, filled with a list of names of people for and against the plant, transcripts of testimonies, and newspaper clippings chronicling the decades-long debate over the storage of spent nuclear fuel.<sup>364</sup>

278. Lea Foushee, of the North American Water Office, stated her concerns regarding cancer risk and radioactive releases from the Prairie Island Plant. Ms. Foushee also voiced her opinion that the Company is “acting outside the law” and that the Company has committed “genocide.”<sup>365</sup> Ms. Foushee submitted additional materials via e-mail to the Administrative Law Judge following the public hearings. Ms. Foushee submitted a 1958 document she referenced during her oral statement at the Public Hearing, entitled “Plan for Prairie Island Steam Plant.”<sup>366</sup>

279. Julie Lee, a citizen of Welch, submitted an e-mail to the Administrative Law Judge stating her opposition to additional nuclear storage at the Prairie Island Plant.<sup>367</sup>

280. Mr. Crocker criticized the DEIS development process as an “awesome example” of corruption, and he urged the Administrative Law Judge to file a document

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<sup>362</sup> Public Hearing (Evening) Tr. at 95-101. See *also* Comments of George Crocker in Support of reliance on a “smart grid.” Public Hearing (Evening) Tr. At 67-87.

<sup>363</sup> Crocker Comments (May 15 and 26, 2009).

<sup>364</sup> Public Hearing (Evening) Tr. at 36-39; Ex. 41.

<sup>365</sup> Public Hearing (Evening) Tr. at 145-49; Ex. 51, NAWO Statement.

<sup>366</sup> Foushee Comments (May 15, 2009).

<sup>367</sup> Lee Comments (May 16, 2009).

with the Commission stating that the documentation supporting the Company's application is "demented" and that the application is deficient.<sup>368</sup>

**D. Will the Design, Construction, Operation, and Retirement of the Storage Facility and Uprate Comply with Applicable State and Federal Laws and Policies?**

281. Before implementing the extended power uprate, Xcel will obtain an amendment to its operating license from the NRC. Xcel is confident that the power uprate will be approved by the NRC, insofar as the NRC has treated such projects favorably in the past. Once the license is in place, Xcel commits to operation of the Prairie Island Plant in strict compliance with federal regulations to safeguard the public health and safety.<sup>369</sup> Failure to do so can result in sanctions to Xcel from the NRC.

282. As discussed in earlier Findings, Xcel intends to file a license amendment with the NRC for the power uprate in 2010.<sup>370</sup> Xcel Energy must also file an amendment with the NRC to change to larger diameter fuel rods to implement the power uprate. Xcel Energy anticipated NRC approval of the change in fuel rod design by mid-2009.<sup>371</sup> Absent approval by the NRC, the uprate project will not go forward.

283. Xcel commits to operate the Prairie Island Plant within all existing water appropriation, water discharge, air and other operating permits.<sup>372</sup> In particular, Xcel's goal is for the Prairie Island Plant to continue to operate within the bounds of its NPDES/SDS permit following implementation of the extended power uprate.<sup>373</sup>

284. The Community argues that until the NRC approves Xcel's applications for license renewal and the extended power uprate, the instant proceeding is premature and the Certificate of Need for the extended power uprate should not be approved.<sup>374</sup> The Community also maintains that the NRC will not evaluate the human health impacts of the extended power uprate.<sup>375</sup>

285. Xcel has presented evidence that the NRC will evaluate the safety of the extended power uprate, and its review process will focus on whether the extended power uprate will comply with NRC regulations and whether the health and safety of the public will be endangered.<sup>376</sup> The record demonstrates that the NRC will perform an evaluation of the safety and related health impacts of Xcel's license renewal and extended power uprate license amendment applications. Following implementation of

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<sup>368</sup> Public Hearing (Evening) Tr. at 67-87.

<sup>369</sup> Ex. 131, Engelking Direct (08-509) at 12; Tr. Vol. 2 at 176-78 (Bomberger).

<sup>370</sup> Ex. 100, CN Application at 3B-28.

<sup>371</sup> Ex. 100, CN Application at 2-8; Tr. Vol. 3 at 98 (Carlson).

<sup>372</sup> Ex. 100, CN Application at 11-4.

<sup>373</sup> Ex. 64, FEIS, Ch. 1 at 68-71, 93; Ex. 136, Carlson Direct at 15.

<sup>374</sup> Community Initial Brief at 28.

<sup>375</sup> Community Initial Brief at 31-32.

<sup>376</sup> Ex. 136, Carlson Direct at 11-12.

the extended power uprate, the NRC, through the Reactor Oversight Process, will continue to monitor the operation of safety systems at the Prairie Island Plant.<sup>377</sup>

286. There has been no showing that deferring Commission consideration of Xcel's application for a Certificate of Need for the proposed extended power uprate is needed to address health or safety issues.

287. The Community also argues that further study and analysis is needed regarding Xcel's 2008 REMP Report for Prairie Island, which concluded that gross beta concentrations ranging from 6.0-13.1 pCi/L are consistent with levels observed from 1993 through 2007 and that the most likely contribution is the relatively high levels of naturally-occurring radium.<sup>378</sup> Xcel noted that the 2008 REMP Report indicated the presence of lead and bismuth through the use of gamma spectroscopy. Xcel explained that lead and bismuth are daughter products of natural radium decay. Xcel described the REMP Report's assessment of gross beta concentrations as being consistent with levels observed from 1993 to 2007 and that there are relatively high levels of naturally occurring radium in the area.<sup>379</sup>

288. There is no evidence in the record to suggest the gross beta concentrations are related to plant operations. There is evidence showing that the observed gross beta concentrations are the result of decay of naturally recurring radium. The request for further study and analysis of Xcel's 2008 Report is not supported by the record.

289. Xcel Energy has demonstrated that the proposed storage facility will comply with applicable state and federal laws and policies.<sup>380</sup>

## **VI. Compliance with Other Statutes**

290. The City maintains that Xcel has failed to comply with the requirements of the Minnesota Environmental Protection Act, Minn. Stat. §§ 116D.01-.11 (MEPA) and the Minnesota Environmental Rights Act, Minn. Stat. §§ 116B.01-.13 (MERA). The City bases this assertion on its position that Xcel lacks an adequate emergency response plan and that "Without an effective Emergency Response Plan, it can only be assumed that an event will cause an uncontrolled release to the immediate environment. This will impair a protectable natural resource."<sup>381</sup>

291. As discussed in Findings above, Xcel has met its requirements for an emergency response plan. Regarding an action under MERA, the Court of Appeals analyzed the material adverse effect element of a prima facie case as follows:

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<sup>377</sup> Ex. 141, NRC Reactor Oversight Process; Tr. Vol. 2 at 176-78 (Bomberger).

<sup>378</sup> Community Initial Brief at 35-36.

<sup>379</sup> Ex. 173, 2008 REMP Report for Prairie Island at 10.

<sup>380</sup> Ex. 45 (Rakow Direct) at 84-87.

<sup>381</sup> City Brief, at 44.

The second element in a prima facie case under MERA is whether the proposed project will inflict a material adverse effect on the protectable resource.<sup>382</sup> Minnesota courts weigh five factors to determine whether the effect is material and adverse:

- (1) The quality and severity of any adverse effects of the proposed action on the natural resources affected;
- (2) Whether the natural resources affected are rare, unique, endangered, or have historical significance;
- (3) Whether the proposed action will have long-term adverse effects on natural resources, including whether the affected resources are easily replaceable . . . ;
- (4) Whether the proposed action will have significant consequential effects on other natural resources . . . ; and
- (5) Whether the affected natural resources are significantly increasing or decreasing in number, considering the direct and consequential impact of the proposed action.<sup>383</sup>

The factors are not exclusive and need not all be met to constitute a material adverse effect.<sup>384</sup>

292. The proposed actions are the continued operation of the Prairie Island Plant at a higher MW production rating and the storage of spent fuel. The City's argument assumes two facts will exist in the future. First, that Xcel will lack an effective response plan and second, that some unforeseen emergency will arise that could have been addressed through an effective emergency response plan. Since Xcel has an effective emergency response plan in place now and Xcel has committed to maintain that plan, even to the extent of self-provision of emergency services, the City has failed to make a prima facie case under MERA.

293. MEPA requires that administrative agencies fully discharge their environmental responsibilities when taking action that has the potential to affect natural resources adversely.<sup>385</sup> The FEIS was prepared to comply with this responsibility. Regarding the concerns raised by the City, the FEIS has concluded that the low levels of radiation emitted from the Prairie Island Plant will be well within NRC limits and that

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<sup>382</sup> See *Minn. Public Interest Research Group v. White Bear Rod & Gun Club*, 257 N.W.2d 762, 768 (Minn. 1977) (stating that proof of pollution, impairment, or destruction of protectable resource may be made by showing conduct complained of materially, adversely affects resource).

<sup>383</sup> *State by Schaller v. County of Blue Earth*, 563 N.W.2d 260, 267 (Minn. 1997).

<sup>384</sup> *Id.*; *State of Minnesota, by Fort Snelling State Park Association v. Minneapolis Park and Recreation Board*, C4-03-36 (Minn. App. December 23, 2003) (<http://www.lawlibrary.state.mn.us/archive/ctappub/0312/op030036-1223.htm>).

<sup>385</sup> See *People For Environmental Enlightenment and Responsibility, Inc. v. Minnesota Environmental Quality Commission*, 266 N. W.2d 858, 864 (Minn. 1978).

the radiation levels do not pose a significant additional risk of harm.<sup>386</sup> The FEIS also found that the non-radiological impacts related to the additional dry cask storage are not significant and that the operation of the ISFSI poses no significant non-radiological impacts.<sup>387</sup> Regarding accidents or terrorist attacks resulting in environmental harm, the record does not establish that such an event will happen or is “likely” to happen.<sup>388</sup>

294. The purpose of the EIS is to determine if the proposed projects will cause any significant impacts and, in this case, the FEIS concluded the proposed projects would have no significant environmental impacts.<sup>389</sup> For the purposes of the Commission’s action on the application in this proceeding, the obligations under MEPA have been met.

295. Xcel Energy has an obligation to comply with the requirements of Minn. Stat. § 216B.1691.<sup>390</sup> OES witness Susan Peirce testified that Xcel Energy is in compliance with Minn. Stat. § 216B.1691 and has met the objective in Minn. Stat. § 216B.1691, subd. 2, to obtain at least 1 percent of its Minnesota retail sales from renewable sources and has plans in place to meet its RES requirements in the future.<sup>391</sup>

296. Minn. Stat. § 216B.243, subd. 3(10) requires the Commission to evaluate whether an applicant is in compliance with the applicable provisions of section 216B.2425, subd. 7. This provision requires utilities to determine what transmission upgrades are needed to support development of renewable energy resources that will meet the objectives of Minn. Stat. § 216B.1691. OES witness Dr. Rakow’s testimony establishes that Xcel has met this statutory standard.<sup>392</sup>

297. Where an applicant is proposing a non-renewable generating facility, Minn. Stat. § 216B.243, subd. 3(12), requires the Commission to evaluate the applicant’s assessment of the risk of environmental costs and regulation on that proposed facility over the expected useful life of the plant, including a proposed means of allocating costs associated with that risk. Xcel Energy addressed the role of risk in its application. OES witness Dr. Rakow concluded that Xcel’s showing has met this criterion.<sup>393</sup>

298. Under Minn. Stat. § 216B.2426, the Commission must ensure that opportunities for the installation of distributed generation are considered in any proceeding under Minn. Stat. § 216B.243. Xcel considered this issue and concluded that distributed generation would be available in sufficient quantities to fill the need demonstrated by Xcel supporting the extension of the Prairie Island Plant’s operation and the uprate of that facility.<sup>394</sup> The OES analysis of alternatives to the proposed

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<sup>386</sup> See Ex. 64, FEIS, Ch. 1 at 91, Ch. 2 at 24.

<sup>387</sup> Ex. 64, FEIS, Ch. 2 at 23.

<sup>388</sup> See Ex. 64, FEIS, Ch. 2 at 29-33.

<sup>389</sup> See Ex. 64, FEIS, Ch. 1 at 93, Ch. 2 at 33, 67.

<sup>390</sup> See Minn. Stat. § 216B.243, subd. 3(10).

<sup>391</sup> Ex. 500, Peirce Direct at 16.

<sup>392</sup> Ex. 510, Rakow Direct (08-509) at 36-38; Ex. 514, Rakow Direct (08-510) at 38-40.

<sup>393</sup> Ex. 510, Rakow Direct (08-509) at 35-36; Ex. 514, Rakow Direct (08-510) at 37-38.

<sup>394</sup> See Ex. 100, CN Application at 6-6.

projects performed by Dr. Rakow considered distributed generation alternatives, particularly regarding the wind plus natural gas option. Dr. Rakow concluded that the proposed projects provided substantial cost and emissions advantages over the considered alternatives.<sup>395</sup>

299. Minn. Stat. § 216H.03, subd. 3(1), does not allow any person to “construct within the state a new large energy facility that would contribute to statewide power sector carbon dioxide emissions.” The OES concluded that neither the continued operation of the Prairie Island Plant, nor the proposed uprate is prohibited by this statute, because the Prairie Island Plant does not contribute to statewide power sector carbon dioxide emissions.<sup>396</sup> The alternatives to both projects would make such contributions, even if the wind plus natural gas option is chosen.<sup>397</sup>

300. Under Minn. Stat. § 216B.2422, subd. 4, the Commission’s issuance of a Certificate of Need of a new or refurbished nonrenewable energy facility is conditioned upon the demonstration that a renewable energy facility is not in the public interest. Xcel Energy and the OES have examined renewable alternatives to the proposed projects. They have demonstrated that renewable alternatives to the continued operation and uprate of the Prairie Island Plant are either not feasible or are more expensive (including environmental costs) than the proposed projects. The record demonstrates that alternative renewable energy resources, when considered as alternatives to Xcel’s proposals, are not in the public interest.<sup>398</sup>

301. Xcel’s compliance with Minn. Stat. § 216B.1691 for the purposes of this proceeding is addressed by the inclusion of the life extension and proposed power uprate in the docket before the Commission regarding Xcel’s 2007 Resource Plan.<sup>399</sup> The Department’s Comments in that Docket and Xcel’s Resource Plan support a conclusion for the purposes of this proceeding that Xcel is in compliance with the renewable energy objectives of Minn. Stat. §216B.1691.

## **VII. Site Permit Standards**

### **A. Statutory and Rule Standards**

302. Minnesota Statutes Chapter 216E and Minn. R. Chapter 7850, parts 7850.1000 through 7850.5600, set forth the process and criteria for reviewing a site permit application for a large electric power generating plant. Minn. Stat. § 216E.03 prohibits construction of a large electric generating plant without first obtaining a site permit from the Commission. The proposed uprate to the Prairie Island Plant is greater than 150 MW, so it qualifies as a large electric power generating plant as defined in

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<sup>395</sup> Ex. 510, Rakow Direct (08-509) at 14, 19-21; Ex. 514, Rakow Direct (08-510) at 11, 19-20.

<sup>396</sup> Ex. 510, Rakow Direct (08-509) at 40-41; Ex. 514, Rakow Direct (08-510) at 41-42.

<sup>397</sup> Ex. 510, Rakow Direct (08-509) at 14, 19-21; Ex. 514, Rakow Direct (08-510) at 11, 19-20.

<sup>398</sup> Ex. 134, Wishart Direct (08-510) at 9; Ex. 133, Wishart Direct (08-509) at (SWW-2), Rev. Table 6-5; Ex. 100, CN Application at 6-16, Table 6-7; Ex. 510, Rakow Direct (08-509) at 27; Ex. 514, Rakow Direct (08-510) at 28.

<sup>399</sup> *ITMO the Xcel Energy Renewable Energy Plan*, MPUC Docket No. E-002/M-07-1558.

Minn. Stat. § 216E.01, subd. 5, and Minn. R. 7850.1000, subp. 11. The uprate project will increase the generating capacity of the Prairie Island Plant, which is an existing large electric power generating plant, and therefore a site permit from the Commission is required under Minn. R. 7850.1300, subp. 3.C.

303. Under Minn. R. 7850.1900, subp. 1.C., an applicant must submit at least two proposed sites for a proposed large electric power generating plant. In this matter, however, Xcel Energy proposes to increase the generating capacity of an existing plant by modifying its operation and making conversions to existing plant equipment. There is no possibility of the uprate project occupying any other location than the existing plant site. Therefore, Xcel need not submit any other alternatives to the existing site.

304. Under Minn. Stat. § 216E.03, subd. 7(a), when making its site permit decision, the Commission must be guided by the state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure.

## **B. Specific Standards for Site Permits**

305. Minn. Stat. § 216E.03, subd. 7(b) sets out the considerations for the Commission in the evaluation and designation of sites and routes. Minn. Rule 7850.4100 implements the above statutory requirements by establishing fourteen categories of considerations to guide the Commission in assessing the adequacy of site applications. Each category will be addressed individually below, at C.-P.

## **C. Effects on Human Settlement**

306. Minn. R. 7850.4100 A. requires the Commission to consider effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services.

307. The uprate project uses a preexisting site, will not require an expansion of the footprint of any of the structures at the Prairie Island Plant, and will not displace any other existing or planned land uses.<sup>400</sup>

308. The visual appearance of plant features from outside the facility boundaries will not change due to the uprate project. Cooling tower operation will involve the discharge of water vapor that will be visible from outside the plant boundaries. The number of days that the cooling towers are used is expected to increase by about 20 days per year. Other than the additional water vapor, the appearance of cooling tower operation will not change as a result of the power uprate.

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<sup>400</sup> Ex. 64, FEIS, Ch. 1 at 59-60; Ex. 136, Carlson Direct at 18-19; Ex. 107, Site Permit Application at 4-31.

No changes are planned that affect the Prairie Island Plant areas located outside the inner security fence due to the uprate project.<sup>401</sup>

309. The power uprate will not result in any significant changes to the character, sources, or energy of noise generated at the Prairie Island Plant. No new significant noise generating equipment is planned as part of the extended power uprate, and no significant increases in ambient noise levels are expected within the Prairie Island Plant.<sup>402</sup>

310. Xcel plans to conduct the modifications to accomplish the extended power uprate at the Prairie Island Plant during refueling periods. During these times, the uprate project will only minimally increase the number of workers at the Prairie Island Plant. Additional traffic generated in the Prairie Island Plant vicinity will be negligible. Uprate equipment deliveries will involve similar types of equipment deliveries as have been made for past refueling periods. After the project has been implemented, the on-going operation of the Prairie Island Plant will not require additional employees and traffic will not differ from current levels.<sup>403</sup> Traffic safety will not be degraded by the uprate project since the routes, number of trips, types of vehicles, or speed are not expected to differ from current conditions.<sup>404</sup>

311. The extended power uprate is not expected to create significant additional jobs for the immediate area. The size of the workforce during the two refueling operations when the power uprate is implemented is not expected to differ significantly from the size of the workforce during a normal refueling operation. The size of the Prairie Island Plant's workforce during periods of normal operation will be the same before and after the power uprate.<sup>405</sup>

312. Since uprate activities will be confined to the Prairie Island Plant boundaries and primarily occur within the existing plant buildings, no impacts to public activities, including recreation, are anticipated. Minor changes in thermal discharge to the Mississippi River are anticipated, but these changes are unlikely to have any noticeable effect on recreation (e.g., sport fishing).<sup>406</sup>

313. No additional demands will be placed on public services because significant changes to the site, workforce, and infrastructure are not anticipated as part of the project.<sup>407</sup> For the foregoing reasons, the uprate project's effects on human settlement will be very limited.

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<sup>401</sup> Ex. 64, FEIS, Ch. 1 at 67-68; Ex. 107, Site Permit Application at 4-32.

<sup>402</sup> Ex. 64, FEIS, Ch. 1 at 65; Ex. 107, Site Permit Application at 4-31 to 4-32.

<sup>403</sup> Ex. 107, Site Permit Application at 4-32.

<sup>404</sup> Ex. 64, FEIS, Ch. 1 at 67.

<sup>405</sup> Ex. 107, Site Permit Application at 4-30.

<sup>406</sup> *Id.*

<sup>407</sup> *Id.*



## **D. Effects on Public Health and Safety**

314. Minn. R. 7849.4100 B. requires the Commission to consider effects on public health and safety. Xcel minimizes the impact of ionizing radiation on workers by monitoring radiation levels, controlling access to radiation areas, and by implementation of the “As Low as Reasonably Achievable” (ALARA) principles discussed earlier.<sup>408</sup>

315. The extended power uprate will involve slight increases in radiation levels present within the Prairie Island Plant. The impact of the increase in radiation dose to workers is minimized through the application of the existing practices already in place at the Prairie Island Plant. These practices will continue to be followed after the uprate project is implemented.<sup>409</sup>

316. The extended power uprate does not create any new or different sources of off-site radiation dosage from the existing operation. The uprate project does not involve significant increases in present radiation levels observed outside of the Prairie Island Plant. The extended power uprate will result in an increase in the production and activity of radioactive gaseous effluents of approximately 10 percent. These gaseous effluents are expected to remain well within regulatory limits after the uprate project is implemented. The higher levels of radioactive gaseous effluents are expected to remain indistinguishable from background radiation.

317. The uprate project will result in an increase in radiation dose rates encountered by persons in the surrounding area. With the increase, described more fully in foregoing Findings, the dosage rate is expected to remain far below federal dose limits. The total amount of exposure to persons in the area is expected to be indistinguishable from background radiation.<sup>410</sup>

318. The extended power uprate will not result in any changes in the operation or design of equipment of the solid and liquid waste systems, and the safety and reliability of those systems will be unaffected. The uprate will result in a small increase in reactor wastes and radioactive solid waste. The extended power uprate will not result in radiological levels above the safe thresholds established by the NRC.<sup>411</sup>

319. Regarding nonradiological emissions, the uprate project is expected to remain within the Prairie Island Plant’s permitted limits.<sup>412</sup> The uprate project does not result in air pollution emissions, which are generally considered harmful to the environment and human health.<sup>413</sup> The primary power generation process does not emit criteria pollutants. The Prairie Island Plant does operate diesel engines and a boiler for supplemental operations. Emissions from these sources will not change

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<sup>408</sup> See Finding 191.

<sup>409</sup> Ex. 107, Site Permit Application at 4-16.

<sup>410</sup> Ex. 64, FEIS, Ch. 1 at 82; Ex. 107, Site Permit Application at 4-13 to 4-15.

<sup>411</sup> Ex. 107, Site Permit Application at 4-11 to 4-12, 4-16 to 4-17.

<sup>412</sup> Ex. 107, Site Permit Application at 4-31.

<sup>413</sup> Ex. 136, Carlson Direct at 18-19.

enough to require a change in the Title V air pollution control operation permit issued by the MPCA.<sup>414</sup>

320. The record in this proceeding shows that the uprate project's effects on public health and safety are reasonably expected to be minimal.

#### **E. Effects on Land-Based Economies**

321. Minn. R. 7849.4100 C. requires the Commission to consider effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining.

322. None of the project-related activities represent any changes in land use or displace other land uses because the site is already developed for power generation. Resources such as groundwater or surface water will be utilized within established appropriation limits. There are no anticipated changes to the distribution or demand for these resources that could affect other economic activities. Tourism, recreation, forestry, and mining activities will not be affected by the proposed projects, on the site or in the immediate environs. No increases or decreases in these activities are expected as a result of the uprate project.<sup>415</sup>

323. For the foregoing reasons, no effects on land-based economies are expected as a result of the project.

#### **F. Effects on Archaeological and Historic Resources**

324. Minn. R. 7849.4100 D. requires the Commission to consider effects on archaeological and historic resources. The Prairie Island Plant is located adjacent to the Prairie Island Indian Community Reservation. There are six National Register historic sites located within five miles of the Plant: five of the historical sites are in Goodhue County, Minnesota, and one is in Pierce County, Wisconsin.<sup>416</sup>

325. Seven archaeological sites have been recorded within the boundaries of the Prairie Island Plant site. Since the proposed uprate project will be limited to the footprint of the existing buildings, no impacts to archaeological artifacts are anticipated from the project.<sup>417</sup>

326. Xcel Energy has developed a corporate procedure, entitled "Excavation and Trenching Controls," to avoid impacts to potential archaeological artifacts during any construction projects on the site. The procedure requires a review of any planned excavation (greater than 6 inches deep) to ensure the protection of archaeological and

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<sup>414</sup> Ex. 107, Site Permit Application at 4-31.

<sup>415</sup> *Id.*

<sup>416</sup> Ex. 64, FEIS, Ch. 1 at 53; Ex. 107, Site Permit Application at 4-27.

<sup>417</sup> Ex. 107, Site Permit Application at 4-27.

historical resources. The procedure protects cultural resources at all of the Company's plant sites. The procedure has been instituted at the Prairie Island Plant.<sup>418</sup>

327. Xcel's Excavation and Trenching Controls provide adequate protection for archeological and historic resources at the Prairie Island Plant. Requiring adherence to this policy as a condition of issuing a Site Permit is appropriate.

## **G. Effects on the Natural Environment**

328. Minn. R. 7849.4100 E. requires the Commission to consider effects on the natural environment, including effects on air and water quality resources and flora and fauna.

329. The uprate project will result in a small increase in the site's discharge canal temperature, and thereby the temperature of water in the Mississippi River. The expected increase will not require any changes to the NPDES/SDS-permitted discharge temperature limits. Xcel will maintain discharge temperatures within current NPDES/SDS permit limits by increasing the use of cooling towers. These towers can operate in various modes (open cycle, closed-cycle and modified helper-cycle operation) to reduce the discharge temperature. Xcel has committed to derating the Prairie Island Plant if needed to meet its permit requirements for water appropriations and thermal discharge. No physical modifications or operational changes are required for these intake or discharge systems to implement the extended power uprate.<sup>419</sup>

330. Monitoring of fish populations in the vicinity of the Prairie Island Plant has demonstrated that the thermal discharge resulting from past operation of the plant has not caused appreciable harm to any aquatic organisms and that the protection and propagation of a balanced, indigenous biota has been maintained. The extended power uprate will not significantly alter the water volume requirements for the heat dissipation system, and operation will continue to be within the temperature limits established by the NPDES/SDS permit. After the power uprate, the discharge plume temperature is expected to continue to have no impact on aquatic biota downstream from the Prairie Island Plant.<sup>420</sup>

331. The probability of the presence of thermophilic microorganisms due to plant operations is low, and the projected increase in the discharge canal temperature will not result in any significant increase in harmful thermophilic organisms in the discharge canal.<sup>421</sup>

332. The extended power uprate will not significantly affect impingement and entrainment of aquatic organisms in the Prairie Island Plant's cooling system. The current NPDES/SDS Permit already reflects major modifications in design and operation of the Cooling Water Intake Structure made in the early 1980s to minimize entrainment

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<sup>418</sup> Ex. 64, FEIS, Ch. 1 at 53; Ex. 107, Site Permit Application at 4-27 to 4-28.

<sup>419</sup> Ex. 64, FEIS, Ch. 1 at 69; Ex. 107, Site Permit Application at 4-20.

<sup>420</sup> Ex. 107, Site Permit Application at 4-21 to 4-23.

<sup>421</sup> Ex. 64, FEIS, Ch. 1 at 49; Ex. 107, Site Permit Application at 4-22 to 4-23.

and impingement mortality and includes the current Clean Water Act Section 316(b) determination for the Prairie Island Plant.<sup>422</sup> No significant increases in the mortality of fish or other aquatic organisms above present levels are expected due to the extended power uprate. The power uprate does not introduce any significant changes to the screen wash, service water, or circulating water flow requirements and does not implicate any changes to the water appropriation requirements of the NPDES/SDS permit.<sup>423</sup>

333. In comments on the EIS Scoping Document and the DEIS, the MDNR expressed concerns about several issues relating to the increased thermal discharge to the Mississippi River following the extended power uprate.<sup>424</sup> In particular, the MDNR expressed concerns regarding loss of fish life from cold shock; increased stress to sensitive aquatic organisms during periods of low stream flow with conditions of high temperatures and humidity; and impacts on ice cover on Lake Pepin.<sup>425</sup>

334. Xcel replied to the MDNR's concerns through filed comments<sup>426</sup> and the testimony of its witnesses Patrick Flowers and Michael Carlson. Xcel has committed to maintain any increased thermal discharge from the Prairie Island Plant within the limits of the existing NPDES/SDS permit issued by the MPCA following the extended power uprate. This increase is expected to amount to a 0.2°F increase at the compliance point, Lock and Dam No. 3, under a worst-case scenario.<sup>427</sup> The water temperature increase at Lock and Dam No. 3, resulting from the increased thermal discharge at the Prairie Island Plant, will not significantly impact fish or other aquatic organisms.

335. Cold shock is the effect on aquatic organisms caused by a sudden reduction in water temperature when warmer discharge is rapidly stopped. This could result from an unplanned shutdown at the Prairie Island Plant. The possibility of an unplanned reactor shutdown is independent of the extended power uprate. Xcel noted that the projected increase in the discharge canal inlet temperature of at most 3°F does not result in a significant increase in the overall discharge canal temperature. From this Xcel concluded that the magnitude of the temperature decrease in a cold shock situation would not change significantly.<sup>428</sup>

336. Xcel has taken steps to address the cold shock concerns of river fish species in the Mississippi River near the Prairie Island Plant by reconfiguring the discharge structure at the end of the discharge canal and through the use of an intake screenhouse. These structures limit the number of fish in the discharge canal and reduce the impact of cold shock on aquatic species in the river.<sup>429</sup>

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<sup>422</sup> Ex. 64, FEIS, Ch. 1 at 47; Ex. 107, Site Permit Application at 4-23.

<sup>423</sup> Ex. 64, FEIS, Ch. 1 at 48; Ex. 107, Site Permit Application at 4-24.

<sup>424</sup> Ex. 60, MDNR Letter (Oct. 7, 2008); Ex. 140, MDNR Letter (May 8, 2009).

<sup>425</sup> *Id.*, See also Ex. 23, MDNR Letter (Feb. 20, 2009).

<sup>426</sup> Ex. 24, Xcel Energy Letter (March 10, 2009).

<sup>427</sup> Tr. Vol. 6 at 120-21, 124 (Flowers); Tr. Vol. 3 at 128-29 (Carlson).

<sup>428</sup> Ex. 64, FEIS, Ch. 1 at 49.

<sup>429</sup> *Id.*, see also Tr. Vol. 6 at 96-97 (Flowers).

337. Environmental monitoring at the Prairie Island Plant has demonstrated that the discharge from past operation has not caused appreciable harm to aquatic organisms and that propagation of a balanced, indigenous biota has been maintained.<sup>430</sup> The current NPDES/SDS permit includes various limits that serve to minimize impingement and entrainment, and the current NPDES/SDS permit limits also act to minimize the size of the thermal plume and resultant stress to aquatic biota when the ambient river temperatures are high.<sup>431</sup>

338. Discharge temperatures at the Prairie Island Plant will remain within the protective limits following implementation of the power uprate, and the increase in temperature will not result in any significant impacts to the environment.<sup>432</sup>

339. The maximum 3°F increase in thermal discharge at the discharge canal inlet would occur when the circulating cooling water system is operated in open-cycle mode. Open-cycle mode is used primarily in the winter when cooling tower operation is not required to meet NPDES/SDS permit temperature requirements. In contrast, during closed-cycle and modified helper-cycle operation, the temperature of water entering the discharge canal is expected to increase by less than 0.5°F.<sup>433</sup> The thermal modeling prepared for the power uprate looked at impacts in low flow scenarios,<sup>434</sup> and determined that the resultant increase in downstream temperature in the modified helper-cycle mode is expected to be less than 0.2°F, even under low flow river conditions.<sup>435</sup> Such a slight increase in temperature will not have a significant impact on the aquatic environment.<sup>436</sup>

340. Xcel noted that the power uprate may cause nominal increases in some wastewater discharges; however, none of the existing NPDES/SDS permit limits will require modification.<sup>437</sup>

341. Groundwater use at the Prairie Island Plant is governed by a water appropriation permit issued by the MDNR. Xcel's expected groundwater usage with the uprate is significantly below the limits in the Prairie Island Plant's groundwater appropriations permit of 355 million gallons per year. Xcel assumed that the uprate would result in a maximum 10 percent increase in groundwater use. The projected maximum use would be approximately 68 million gallons per year. This amount is significantly less than the 355 million gallons per year permit limit. The extended power uprate project will not affect compliance with the permit limits.<sup>438</sup>

342. The Extended Power Uprate is expected to increase surface water appropriations through evaporation by approximately 1,300 acre ft/year or 10 percent.

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<sup>430</sup> Ex. 64, FEIS, Ch. 1 at 47.

<sup>431</sup> Ex. 64, FEIS, Ch. 1 at 47-48.

<sup>432</sup> Ex. 64, FEIS, Ch. 1 at 69-70.

<sup>433</sup> Ex. 64, FEIS, Ch. 1 at 70; Tr. Vol. 3 at 162-63 (Carlson).

<sup>434</sup> Tr. Vol. 3 at 125-26 (Carlson), Tr. Vol. 6 at 122 (Flowers).

<sup>435</sup> Ex. 64, FEIS, Ch. 1 at 70.

<sup>436</sup> Ex. 64, FEIS, Ch. 1 at 70.

<sup>437</sup> Ex. 107, Site Permit Application at 4-19.

<sup>438</sup> Ex. 64, FEIS, Ch. 1 at 74; Ex. 136, Carlson Direct at 15.

This increase is within the limits of the current surface water appropriation permit issued by the MDNR.<sup>439</sup> Increased use of the evaporative cooling towers will slightly increase the amount of water used at the Prairie Island Plant, but water consumption will remain approximately 1 percent of the lowest annual mean Mississippi River flow. Impacts caused by the higher evaporative losses from the Mississippi River are very small and will likely have insignificant impact on the Mississippi River flow.<sup>440</sup>

343. The minimal effects on the natural environment, including effects on air and water quality resources and flora and fauna, support the granting of a Site Permit for the Extended Power Uprate.

## **H. Effects on Rare and Unique Natural Resources**

344. Minn. R. 7849.4100 F. requires the Commission to consider effects on rare and unique natural resources. The proposed extended power uprate will be limited to the existing plant footprint. Therefore, no incremental impacts to native plant communities or terrestrial organisms, including birds, are anticipated. The primary effect of the extended power uprate will be a slight increase in the temperature of the cooling water discharged to the Mississippi River primarily during the fall and winter, when “once through” cooling is used.<sup>441</sup>

345. Through records from the National Heritage Information System (“NHIS”) database, which includes known locations of endangered, threatened and special concern species, as well as occurrences of unique or uncommon plant communities and habitat types, the MDNR has documented birds, fish, mollusks, plants and amphibians in the vicinity of the Prairie Island Plant.<sup>442</sup>

346. Any impact to mollusks and other aquatic organisms would be related to changes in water quality, such as an increase in thermal discharge into the Mississippi River. The slight increase in temperature of cooling water discharge, however, is not expected to affect mollusk species, including the Higgins eye pearly mussel, or other aquatic organisms.<sup>443</sup>

347. The Prairie Island Plant is located in the Mississippi Flyway, a major route for migratory bird species. State-threatened peregrine falcons have been observed nesting within the site since 1997. Bald eagles, a state-listed species of special concern and previously listed as threatened at the federal level, have been observed within the vicinity of the site. Additionally, the original Prairie Island FEIS stated that trumpeter swans, which are state-listed as threatened, might migrate through the plant area, and records indicate that trumpeter swans are occasionally observed in Goodhue County.

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<sup>439</sup> Ex. 64, FEIS, Ch. 1 at 69; Ex. 136, Carlson Direct at 15; Ex. 107, Site Permit Application at 4-18.

<sup>440</sup> Ex. 64, FEIS, Ch. 1 at 68-69, 93.

<sup>441</sup> Ex. 64, FEIS, Ch. 1 at 50, 93; Ex. 107, Site Permit Application at 4-25.

<sup>442</sup> Ex. 107, Site Permit Application at 4-25.

<sup>443</sup> Ex. 64, FEIS, Ch. 1 at 51; Ex. 107, Site Permit Application at 4-26.

The slight increase in discharge temperature to the Mississippi River in the area will not affect these bird species.<sup>444</sup>

348. No changes to land use are anticipated as a result of the power uprate, and there are no anticipated impacts to rare and unique natural resources or species. These factors favor the issuance of the requested Site Permit.

## **I. Design Option Efficiencies**

349. Minn. R. 7850.4100 G. requires the Commission to consider application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity.

350. The project is an expansion of an existing facility, taking full advantage of existing infrastructure and minimizing land use impacts. The project uses an existing plant and site, more fully utilizing the existing generation and transmission infrastructure and foregoing the need to develop a new greenfield site for new generation.<sup>445</sup>

351. Approval of the extended power uprate will help Xcel Energy comply with the RES by relieving natural gas plants of the obligation to provide base load power, freeing them to operate as a complement to Xcel Energy's expanding use of wind resources. Xcel described the synergies gained through this use of baseload power as an extremely efficient use of energy supply resources.

352. Adding additional power obtained through nuclear generation maintains diversity in Xcel's generation portfolio. Xcel noted that this results in the protection of its customers from the impact of price increases in other fuels.<sup>446</sup>

353. The production of electricity by the extended power uprate results in no emissions of greenhouse gases or other air pollutants associated with fossil-fuel generation, such as SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, lead, or mercury.<sup>447</sup> The Extended Power Uprate provides these benefits without increasing the Prairie Island Plant's footprint or developing a new greenfield site, while making use of existing electric transmission infrastructure.<sup>448</sup>

354. The extended power uprate will not have any significant negative environmental impacts. Xcel commits to operating the Prairie Island Plant within the bounds of all applicable environmental permits following the Extended Power Uprate.<sup>449</sup> These factors favor the issuance of the requested Site Permit.

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<sup>444</sup> Ex. 64, FEIS, Ch. 1 at 51; Ex. 107, Site Permit Application at 4-26 to 4-27.

<sup>445</sup> Ex. 131, Engelking Direct (08-509) at 7.

<sup>446</sup> Ex. 100, CN Application at 1-15, 10-2; Ex. 131, Engelking Direct (08-509) at 5.

<sup>447</sup> Ex. 131, Engelking Direct (08-509) at 8, 11, Tr. Vol. 4 at 81-82 (Engelking).

<sup>448</sup> Ex. 131, Engelking Direct (08-509) at 13.

<sup>449</sup> Ex. 136, Carlson Direct at 13-14, 17.

## **J. Routing Efficiencies**

355. Minn. R. 7850.4100 H. requires the Commission to consider use of paralleling or existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries. There are no routing issues raised by Xcel's site permit application.

## **K. Siting Efficiencies**

356. Minn. R. 7850.4100 I. requires the Commission to consider use of existing large electric power generating plant sites. The proposed Extended Power Uprate Project will use the existing Prairie Island Plant site.

## **L. System Efficiencies**

357. Minn. R. 7850.4100 J. requires the Commission to consider use of existing transportation, pipeline, and electrical transmission systems or rights-of-way. The project will use existing transmission lines. The full scope of modifications to the transmission grid required to accommodate the power uprate are not known with certainty. Preliminary studies have indicated that a steady state power flow is supported satisfactorily by the existing system. No evidence has been presented that the power uprate would involve creation of new transmission corridors.<sup>450</sup>

## **M. Electrical System Reliability**

358. Minn. R. 7850.4100 K. requires the Commission to consider electrical system reliability. Xcel has shown that the proposed extended power uprate will ensure continued reliability of the state electricity system by supplying dependable, low-cost, carbon-free, base load power. This power could be reliably replaced, but only from more expensive sources. Approving the uprate project will improve the ability of Xcel Energy to satisfy the energy needs of its Minnesota customers as Xcel increases the percentage of its generating capacity from wind resources and removes carbon-emitting generation units from its system. The resulting changes will have a positive impact on meeting the needs of Minnesota customers.<sup>451</sup> OES witness Hwikwon Ham testified that the extended power uprate will have a positive impact in meeting the state's energy need.<sup>452</sup>

359. Consideration of electrical system reliability favors granting the requested Site Permit.

## **N. Design and Route Dependent Costs**

360. Minn. R. 7850.4100 L. requires the Commission to consider costs of constructing, operating, and maintaining the facility which are dependent on design and route. The estimated installed cost of the 164 MW of additional capacity at the Prairie

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<sup>450</sup> Ex. 107, Site Permit Application at 2-4; Ex. 100, CN Application at 8-26.

<sup>451</sup> Ex. 100, CN Application at 10-1.

<sup>452</sup> Ex. 504, Ham Direct (08-509) at 6.



Island Plant achieved by the proposed Extended Power Uprate is approximately \$322 million.<sup>453</sup> Any other approach would cost so much more as to render infeasible any alternative to the project.

**O. Adverse Human and Natural Environmental Effects**

361. Minn. R. 7850.4100 M. requires the Commission to consider adverse human and natural environmental effects which cannot be avoided. As discussed more fully in the Findings above, no significant adverse human, natural, or environmental effects have been identified as a result of the proposed Extended Power Uprate Project.<sup>454</sup> In areas where the potential exists for such adverse effects, such as tritium contamination or ice formation through thermal discharge, reasonable conditions have been recommended to explore and address such effects.

**P. Irreversible and Irretrievable Commitments of Resources**

362. Minn. R. 7850.4100 N. requires the Commission to consider irreversible and irretrievable commitments of resources. No irreversible or irretrievable commitments of resources have been identified as a result of the Extended Power Uprate Project.

**Q. Proposed Conditions on Site Permit**

363. The PINGP Study Group proposed as a condition on the issuance of the Site Permit that multiple samples and adequate monitoring procedures to demonstrate that “cask expansion and continued operation of the Nuclear Plant would comply with radium and gamma radiation limits” be required of Xcel.<sup>455</sup> There has not been a sufficient showing to demonstrate that this proposed condition is reasonable.

364. The Community proposed that a genetic monitoring program be undertaken as a condition of the Site Permit to identify any potential health impacts arising from low-dose radiation emitted from the Prairie Island Plant. As discussed in the foregoing Findings, there has not been a sufficient showing to demonstrate that this proposed condition is reasonable.

365. The Community proposed that Xcel address the observed levels of tritium in groundwater, by imposing conditions on Xcel’s Site Permit that require full implementation of NEI’s groundwater initiative, quarterly reporting of status and monitoring results, discontinuing the discharge of liquids into a landlocked area of the Plant, initiating a comprehensive surface investigation in and around wells P-10, MW-7 and MW-8 (including consideration of the installation of other monitoring wells), and identifying the source and quantity of all liquid and gaseous tritium emissions, including a comprehensive explanation for the fluctuating amounts of tritium released and detected in PINGP’s monitoring wells. As discussed in the foregoing Findings, all save

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<sup>453</sup> Ex. 107, Site Permit Application at 3-11.

<sup>454</sup> See Ex. 64, FEIS, Ch. 1 at 93.

<sup>455</sup> PINGP Study Group Comment, at 22-23.

the last of these proposed conditions (identifying sources and amounts of all tritium emissions) are reasonable.

366. The Community proposed that Xcel fund a study to assess the impact of the Prairie Island Plant's thermal discharge on the environment, particularly regarding the formation of ice on Lake Pepin. The record in this proceeding supports the conclusion that a noticeable change in the formation of ice has occurred and that this change has coincided with a change in operations at the Prairie Island Plant affecting thermal discharge. As discussed in the foregoing Findings, this proposed condition is reasonable.

367. The City has requested that the Commission require Xcel to make dedicated payments to the City as a condition of granting the CONs and Site Permit to avoid the potential for detrimental socioeconomic and environmental impacts through an insufficient Emergency Response Plan.<sup>456</sup> The City has not demonstrated that there will be a lack of an effective Emergency Response Plan. There has not been a sufficient showing to demonstrate that this proposed condition is reasonable.

368. The OES recommended that the Commission require Xcel to provide as a compliance filing a status report or filing as to its emergency response plan. The OES suggested that Xcel include its filing in this regard as part of its annual compliance filing on nuclear waste management in Docket No. E002/CN-91-19. OES recommended that Xcel include a statement as to the role played by non-company emergency response resources such as the City of Red Wing, or other entities.<sup>457</sup> This is a reasonable condition on the Site Permit.

Based on the Findings of Fact, the Administrative Law Judge makes the following:

## **CONCLUSIONS**

1. Any of the foregoing Findings of Fact more properly designated as Conclusions are adopted as such, and any Conclusions more properly designated as Findings of Fact are adopted as such.

2. The Administrative Law Judge and the Minnesota Public Utilities Commission have jurisdiction over the subject matter of this hearing pursuant to Minn. Stat. §§ 116C.83, 216B.08 and .243, and 216E.02, subd. 2.

3. All relevant procedural requirements of law and rules have been fulfilled prerequisite to the issuance of Certificates of Need to the Applicant regarding the proposed power uprate of the Prairie Island Plant and the expansion of the associated ISFSI.

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<sup>456</sup> Ex. 300, (Hand Direct); Ex. 303, (Hallock Direct); Ex. 305, pgs. 3-4 (Hallock Surrebuttal).

<sup>457</sup> Tr. V. 5 at 194-195 (Rakow). See also, Tr. V. 6 at 51-58 (Rakow).

4. The PUC provided legally sufficient public notice of the public meetings held in this matter by publication in a legal newspaper of general circulation in the location where the project is proposed to be located, as required by Minn. R. 7850.3500.

5. The forecasts, power system analyses, and cost analyses presented in these proceedings through Xcel Energy's CON Applications, Exhibits, and witness testimony were reliable and appropriate for determining the need for the expansion of the ISFSI and Xcel's proposed uprate of the Prairie Island Plant.

6. Shutdown of the Prairie Island Plant would adversely affect the future adequacy, reliability, safety and efficiency of the energy supply to Xcel's customers, and the people of Minnesota, and persons in neighboring states.

7. Replacing the Prairie Island Plant with any other form of new generation would result in significantly higher costs for Xcel to produce electrical power.

8. Replacing the Prairie Island Plant with new generation would result in less reliability in the supply of electricity, at least during the period when new plants are under construction.

9. Replacing the Prairie Island Plant with new generation using a coal or natural gas fueled-facility would result in significant negative air quality impacts.

10. Removing the Prairie Island Plant from the electrical supply system would create a 1,100-megawatt and 9 million megawatt hour per year electrical deficit in the region beginning in 2014.

11. Power generated by continued operation of the Prairie Island Plant is less expensive (including environmental costs) than power that could be generated by any currently available combination of renewable energy sources.

12. Not increasing the generating capacity of the Prairie Island Plant would adversely affect the future adequacy, reliability, and efficiency of the energy supply to Xcel's customers, the people of Minnesota, and people in neighboring states.

13. Xcel Energy has demonstrated that the demand for electricity cannot be met in a more cost effective way through energy conservation and load-management measures.

14. The extended power uprate at the Prairie Island Plant will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health.

15. The Prairie Island Plant generates a thermal discharge through normal operations. This thermal discharge is regulated through a NPDES/SDS permit issued by the MPCA. Concerns were raised regarding the impact of the thermal discharge on aquatic life and the formation of ice on Lake Pepin. There has been no showing that

conditions are needed on the Site Permit to address the impact of the proposed power uprate on aquatic life. While the MPCA has jurisdiction over the limits to the thermal discharge from the Prairie Island Plant, additional research and analysis is useful and reasonable to aid in the determinations to be made regarding that discharge permit. The recommended conditions of the Community regarding study of the impact of the Prairie Island Plant's thermal discharge on the seasonal formation of ice on Lake Pepin are reasonable additions to the Site Permit for the Proposed Uprate.

16. Xcel has thoroughly explored the possibility of generating needed additional power by means of renewable energy sources and has demonstrated that obtaining that additional power through renewable energy facilities is not in the public interest when compared to the Proposed Uprate Project.

17. No more reasonable and prudent alternative to the extended power uprate of the Prairie Island Plant has been demonstrated to exist.

18. Xcel is in compliance with Minn. Stat. § 216B.1691 and has met the objective in Minn. Stat. § 216B.1691, subd. 2, to obtain at least 1 percent of its Minnesota retail sales from renewable sources and has plans in place to meet its RES requirements in the future.

19. The extended power uprate is in compliance with Minn. Stat. § 216H.03 because the uprate will not contribute to statewide power sector carbon dioxide emissions.

20. Xcel has demonstrated that the design, construction, or operation of the Prairie Island Plant following the extended power uprate will comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

21. The current storage capacity for spent nuclear fuel assemblies at the Prairie Island Plant will be exhausted at the end of the reactors' current operating licenses in 2013 and 2014. To continue to operate at current levels through 2034, the Prairie Island Plant will require up to 35 spent fuel containers more than are currently authorized at the Prairie Island Plant ISFSI. It is appropriate to address any temporary storage required for decommissioning in a future proceeding.

22. No more reasonable and prudent alternative to the Prairie Island Plant has been demonstrated to exist.

23. Reprocessing is not a viable alternative to dry-cask storage at the PINGP. The by-products of reprocessing produced and reused in France are of a type that cannot be reused at the PINGP. Reprocessing facilities have not been developed in the United States.

24. Temporary, off-site storage of spent nuclear fuel from the PINGP is not presently available. Permanent, off-site storage is also not yet available.

25. Fuel rod consolidation would only nominally increase pool storage capacity and poses risks of occupational exposure and generation of additional radioactive materials. Similarly, replacing existing storage racks with new racks that hold more fuel assemblies would not provide storage sufficient to allow operation for significant additional time.

26. Construction and operation of on-site storage is the best alternative for meeting the storage needs of the Prairie Island Plant.

27. Continued operation of the Prairie Island Plant will support future regional development by sustaining a highly skilled workforce and contributing to local tax bases and revenues.

28. Expansion of the ISFSI and continued operation of the Prairie Island Plant is consistent with the state's energy policy, as outlined in the most recent Energy Policy and Conservation Report, because it provides safe, reliable, low-cost power and does not emit air pollution.

29. The dry cask storage system selected by Xcel will comply with Minn. Stat. § 116C.83, subd. 4, by managing spent nuclear fuel in a manner that facilitates its transfer out of state to a permanent or interim repository as soon as feasible and allows continued operation of the plant.

30. Xcel has complied with the renewable energy objectives of Minn. Stat. § 216B.1691 by its continued acquisition of wind power resources described in its Resource Plan filing. Xcel's future plans to continue to meet the renewable energy objective are to be reviewed in subsequent proceedings.

31. Regulation of the emergency response plan at the Prairie Island Plant and ISFSI is the responsibility of the NRC. Xcel's compliance with NRC rules will ensure that there is an effective emergency response plan in place. It is reasonable to require Xcel to file a Status Report on implementation of its Emergency Response Plan (ERP). The City of Red Wing has not shown that it will incur any additional costs due to the proposed projects. There is no indication that the NRC will require any particular action by the City in regard to the proposed projects, and thereby cause the City to incur any additional costs. Xcel is not requesting any additional services to accommodate the improvements.

32. Xcel has demonstrated radiation emissions from the Prairie Island Plant at its proposed operating levels are significantly below the NRC radiation dose limits. The NRC limits are protective of human health and are consistent with the large body of research on the health risks of low dose radiation. These limits will protect human health following implementation of the extended power uprate.

33. Xcel Energy has a comprehensive radiation environmental monitoring program in place at the Prairie Island Plant that meets the NRC's radiation monitoring requirements. Xcel, the MDH, and the Wisconsin Department of Health Services perform extensive radiation monitoring in and around the Prairie Island Plant. The

Community proposed that additional radiation monitoring be conducted as a condition of approval of Xcel's applications. The equipment proposed for this monitoring is less sensitive than that used in Xcel's monitoring program. There is no reasonable basis for conducting less sensitive monitoring than is already conducted around the Prairie Island Plant.

34. There has been no demonstration that the operation of the Prairie Island Plant raises significant risk of adverse impacts to the health of the residents living in the vicinity. There has been no showing that the proposed genetic testing of persons residing in the vicinity of the Prairie Island Plant is appropriate for inclusion in the conditions to be imposed on the Site Permit for the extended power uprate.

35. Xcel has a comprehensive groundwater monitoring program regulated by the NRC in place at the Prairie Island Plant. Xcel performs additional groundwater monitoring under its special tritium monitoring program. The results of that monitoring show that tritium continues to be detected in the vicinity of the Prairie Island Plant. While the amounts of tritium are not large enough to cause health concerns, expansion of groundwater monitoring is a reasonable condition to impose on the issuance of a Site Permit for the proposed power uprate.

36. Expansion of the ISFSI and continued operation of the Prairie Island Plant would serve the public interest.

37. Xcel has demonstrated that its proposed ISFSI expansion and proposed power uprate each satisfy the criteria for a Certificate of Need in Minn. Stat. §§ 116C.83 and 216B.243, subd. 3, and Minn. R. 7855.0120.

38. There are no reasonable and feasible alternatives to the expansion and operation of the existing ISFSI for on-site spent nuclear fuel storage at the Prairie Island Plant.

39. The Certificates of Need requested by Xcel Energy should be issued.

40. The FEIS prepared for this proceeding addresses the issues and alternatives raised in scoping to a reasonable extent considering the availability of information and the time limitations for considering the permit application, provides responses to the timely substantive comments received during the draft environmental impact statement review process, was prepared in compliance with the procedures in Minn. R. 7850.1000 to 7850.5600, and is adequate.

41. Xcel Energy has demonstrated that the proposed Extended Power Uprate satisfies the criteria for a Site Permit in Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4000 and 7850.4100.

42. It is appropriate to issue the Site Permit requested by Xcel, subject to the conditions discussed in this Report.

Based on the Conclusions, the Administrative Law Judge makes the following:

## RECOMMENDATIONS

**IT IS RECOMMENDED** that the Commission issue a Certificate of Need for additional dry cask storage at the Prairie Island ISFSI with up to 35 (thirty-five) additional spent fuel containers and associated equipment; that the Commission issue a Certificate of Need to Xcel Energy for a 164 megawatt increase in the generating capacity of the Prairie Island Plant; and that the Commission issue a LEPGP Site Permit to Xcel Energy to increase the generating capacity of the Prairie Island Plant by 164 megawatts, subject to conditions regarding emergency response plan status, expansion of tritium monitoring in the groundwater, the study of the impact of thermal discharge on the seasonal formation of ice on Lake Pepin, and adherence to Xcel's Excavation and Trenching Controls to protect archeological and historic resources. To comply with the requirements of Minn. Stat. § 116C.83, subd. 3, the Administrative Law Judge **RECOMMENDS FURTHER** that the Commission stay the effectiveness of the Certificate of Need for the ISFSI pending legislative review.

Dated: October 21, 2009

s/Richard C. Luis

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RICHARD C. LUIS  
Administrative Law Judge

Reported: Court Reported, Transcript Prepared (Six Volumes)  
Shaddix & Associates

## NOTICE

Under the PUC's Rules of Practice and Procedure, Minn. R. 7829.0100 to 7829.3200, exceptions to this Report, if any, by any party adversely affected must be filed with the Executive Secretary of the PUC, 350 Metro Square Bldg., 121 Seventh Place East, St. Paul, Minnesota 55101-2147, in accordance with Part 7829.2700, within 15 days of the filing of the Report. Exceptions must be specific, relevant to the matters at issue in this proceeding, and stated and numbered separately. Proposed Findings of Fact, Conclusions, and Order should be included, and copies thereof shall be served upon all parties.

The PUC shall make its determination on the matters of the Certificates of Need and Site Permit after expiration of the period to file Exceptions as set forth above, or after oral argument, if such is requested and had in the matter. Notice is hereby given that the PUC may accept, modify, condition, or reject this Report of the Administrative Law Judge and that this Report has no legal effect unless expressly adopted by the PUC.

Notice is further given that pursuant to Minn. Stat. § 116C.83, subd. 3, the PUC's decision shall be stayed until June 1 following the next regular annual session of the

Legislature that begins after the date of the PUC decision to allow for legislative review. If the Legislature does not modify or reject the PUC's decision by law enacted during that regular legislative session, the decision shall become effective on the expiration of the stay.